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Issue File

UAE and Saudi Arabia:

Fraternal relations and a firm partnership in the face of challenges and risks

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A Specialized Monthly Journal on Military & Strategic Affairs

Sheikh Mohamed graced new Egypt military base opening

Sensor System Upgrade Makes Typhoon More Lethal

nation shield Issue No. 547 August. 2017

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Editorial

Sudan and "Operation Decisive Storm" Honorable Stand

By:
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Sudanese poet Al-Mossa'ed Mohammed Ali's piece "Hadandowa – a Blue Wave and Arabs" is quite striking and illuminating when citing the protection of religion, the holy shrines, Arab land and support for legitimacy and the brotherly Yemeni people as the main reason for intervention in Yemen. The poem explained:

Time has come for the invoker to scream Yemen:Sanaa, Haderamout and AdenAir-sported infantryAnd the army was Sudan

Deciding to take part in "Operation: Decisive Storm", Sudan was entirely aware that this step was dictated by its pan-Arab role and responsibility. If Yemen was left out for Iran, Teheran will soon overstretch to the other side of the Red Sea until reaching Sudanese land. Iran has previously used several ways to infiltrate Sudan until Iranian games and tricks were blown out and aborted by Khartoum. It was, moreover, impossible for Sudan to stay behind, turn a blind eye or stall in supporting legitimacy in a nation ravished by extremists, warlords and foreign agents.

The Sudanese role, highly crucial, in "Operation: Decisive Storm" is rightly recognised by Saudi Arabia and the UAE who speak volumes about the Sudanese forces' courage, valour and outstanding role in the war currently underway. They also highlight the continuous staunch relations between Sudan and the member nations of the Gulf Cooperation Council (GCC), which was stressed clearly by the Arab Coalition Command in Support of Yemen's statement which expressed their deepest appreciation of the Sudanese forces' role for fighting side by side with Coalition counterparts to alleviate the sufferings of the Yemeni people and restore both local and regional security and stability.

The Sudanese President Omar Al Bashir is totally aware of both Abu Dhabi and Riyadh's appreciation of the Sudanese forces intervention in the Saudi-led "Operation: Decisive Storm" to restore legitimacy in Yemen. Bashir's statement pointed out that, "Sudan's support for Arab Coalition is a duty dictated by brotherhood and Arab security, and we are honoured to play a part with our brothers in protecting the security, peace, stability and interests of the Arab nations." Meanwhile, General Emad Eddin Moustafa Adawi, Chief of Staff of the Sudanese Armed forces, affirmed that the Sudanese Army would continue to execute the Supreme Command's policies vis-à-vis foreign intervention and cooperation with sisterly and friendly nations. He referred to the Sudanese army's participation in "Operation: Decisive Storm" and Saudi-based "North Thunder" military exercise.

Meanwhile, His Highness Sheikh Mohammed bin Zayed Al Nahyan, Crown Prince of Abu Dhabi and Deputy Supreme Commander of the Armed Forces, expressed his deepest appreciation of the honourable stand of the sisterly Arab nation and the leadership of Sudanese President Omar Hassan Al Bashir for joining the Arab Coalition and supporting Saudi-led "Operation: Bring Home" in Yemen. His Highness noted that Sudan hastened, entirely voluntarily, to show support and side with Arab coalition, and lauded the Sudanese forces stationed in various fields of operation side-by-side with their brotherly Arab counterparts. His Highness also pointed out that the brotherly Sudanese forces that share trenches and frontlines with our sons have iron-will and rock-solid determination. He affirmed that Sudan's honourable stand, response and support for the coalition forces would always be remembered by Arab history and the present and future generations.

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Innovation, Celebration And

The 52nd International Paris Air Show took place at the Le Bourget Parc des Expositions from June 19 to 25, gathering global players and the latest technological innovations.

The first four days were reserved for trade visitors, followed by three days for the general public.

Traditional plane makers, space adventurers, software developers, and futuristic concepts were all battling for attention. The biennial Paris Air Show is one of the biggest events on the calendar of aviation events.

The Paris show, which alternates with a sister show in the UK's Farnborough, is one of the largest aviation and defence industry events on the planet. The event is a must for aircraft-makers and other industry firms wishing to show off their latest planes and products.

French President Emmanuel Macron opened the Paris Air Show from the skies, landing at Le Bourget in an Airbus A400-M military transporter.

There were 290 official delegations from 98 countries, and seven international organisations. Bourget saw 160 official defence delegations from 86 countries and from NATO, the UN, OCCAR and the EU. Some 16 foreign ministers, 40 Chiefs of Staff, 20 deputy ministers or Secretaries of State graced the event.

Business deals worth US$150 billion were announced during the event, including 897 orders and purchasing commitments for a catalogue value of US$115 billion, for a total of 934 commercial aircraft.

This year's event saw 2381 exhibitors and 322 000 visitors: 142 000 trade visitors and 180 000 general public.

Displays and attractions

The impressive demonstration flights of Dassault Aviation's Falcon 8X by a French Air Force pilot, presentations of the A380 by Patrouille de France , the aerobatic demonstration team, the Airbus A350-1000 and A400M, and other aircraft all delighted visitors.

The Careers Plane exhibition, now amalgamated with GIFAS' Job-Training Forum, enabled 55,000 young visitors to discover forty or so aeronautics and space sector careers through French aerospace group employees.

Paris Air Lab, a new attraction, puts the spotlight on research and innovation efforts of the major groups and institutions such as start-ups, attracted 50,000 visitors.

Pavilions

There were 27 national pavilions, and 140 static and flying display aircrafts,

Bursting Order Books: Paris 2017

including the Airbus A321neo and A350-1000, Boeing B787-10 and B737 Max9, Kawasaki P1 maritime patrol aircraft, Mitsubishi MRJ90 and Lockheed Martin F-35 fighter plane at Le Bourget for the first time.

One of the show's top sights remains aircraft performance flights, meant to highlight a plane's capabilities. There are few things like seeing a giant Airbus A380 superjumbo being put through its paces as a crowd of industry insiders and aviation enthusiasts looks on from below.

Boeing vs Airbus

Boeing unveiled plans for a newer and bigger version of its 737 Max 10 aircraft as it intensifies its battle with Airbus in the market for narrow-body passenger jets.

Airbus clinched deals for its single-aisle A320neo planes, in its first big move at the Paris Air Show, where the European plane maker is competing with Boeing for orders amid burgeoning competition from China.

The A320neo, designed to use less fuel than the A320, have proven popular and are competing with Boeing's 737 Max series.

US on Europe's side

When the stealthy hi-tech F-35 fighter jet teared through Paris skies on its first ever acrobatic displays, the jet was also sending a message: "NATO allies, the US is always on your side."

Thales and Inmarsat announced a successful series of trials demonstrating the System 21 satellite communications (SATCOM) ground segment.

System 21 includes a secure and reconfigurable multiple waveform military modem, which is in use with several military SATCOM programmes. The GX constellation comprises four Ka-band satellites with a combination of fixed narrow spot beams and steerable beams, which can be redirected in real time to provide additional capacity.

Tests, which took place in May 2017, used the steerable GX beams and achieved data rates of over 34 Mbit/s between two Thales terminals, a 1.5 m maritime SURFSAT-L, and a 0.75 m airborne LISA.

Koreans join training initiative

South Korea's LIG Nex1 has signed an agreement with the Netherlands Aerospace Centre (NLR) to co-develop systems for military and commercial aircraft. LIG Nex1 signed an MOU at the show, which will initially focus on the joint development of an embedded training system for fighter aircraft pilots.

French Minister for Transport, Élisabeth Borne with Eric Trappier, Chairman and CEO of Dassault Aviation and President of GIFAS

The two companies will look to develop a simulation-based training system for a range of fighter aircraft platforms. Kwon Hee-won, LIG Nex1 CEO said the company "will [look to] contribute to local fighter jet development projects and also find new business opportunities abroad."

Vive le deals

Boeing enjoyed a flurry of orders thanks to the launch of its 737 MAX 10, with 361 orders and commitments booked. Add in a good 787 showing, and Boeing beat Airbus, booking 820 orders and commitments. Excluding the 208 737 MAX 10 conversions and the unidentified orders that transitioned to identified, Boeing puts its incremental orders and commitments at 571 aircraft.

Embraer booked 51 orders and commitments, the majority for its E2 jets, not legacy E jets. This bodes well for the E2, but means it still needs more orders for its older E jets to bridge the gap to the new E2.

Bombardier booked 60 Q400s - 50 from Indian carrier SpiceJet - but walked away with no firm C Series orders, noting that Ilyushin Finance, a Russian lessor, and an undisclosed airline signed a framework agreement to lease six CS300s.

MBDA's new ground-based air defence (GBAD) command and control (C2) system, Network-Centric Engagement Solutions (NCES), was revealed at the event. The system provides a flexible network of sensors, effectors, and fire control centres (FCC) operating on a single network. It is scalable from battery to national level, and can interface with an air operations centre (AOC) providing upper-level C2.

Russia's United Aircraft Corporation (UAC) is completing flight trials of its latest MiG-35 'Fulcrum-F' combat aircraft soon, ahead of the launch of serial production in 2018. Speaking at the show, general director of MiG, Ilia Tarasenko, said the launch of serial production in 2018 will mark the adoption of the latest-variant Fulcrum by the Russian defence ministry.

A contract for the MiG-35 will be included in the next State Armament Program to be implemented in 2018. Russian Aerospace is planning to gradually replace all the current MiG-29 aircraft with the MiG-35 model.

Airbus Defense and Space (DS) is set to deliver its first armed intelligence, surveillance, and reconnaissance (ISR) C295 aircraft to an undisclosed cus-

Patroller is an unmanned air vehicle, designed and manufactured by Safran


Public day at the Paris Air and Space Show

tomer in September. The modified aircraft features a forward-looking infrared (FLIR) under the nose, a multimode search radar with maritime and ground surveillance modes, a palletised version of Airbus DS' newest Fully Integrated Tactical System (FITS), (featuring additional screens for improved situation awareness), and a pair of 12.7mm manually operated heavy machine guns firing through the rear parachuting doors.

Bulgaria's Light Armed Surveillance Aircraft (LASA) Engineering showcased its T-Bird intelligence, surveillance, and reconnaissance (ISR) counter-insurgency (COIN) aircraft for the first time at Paris.

Based on the Thrush 510G agricultural aircraft airframe, the T-Bird is fitted with an ISR sensor suite developed and integrated by Airborne Technologies of Austria. The aircraft is a twin-seater with the pilot sitting in the front and a sensor operator sitting in the rear. The aircraft on display featured 3D printed replicas of 57 mm rocket launchers and twin 23 mm cannon pods.

Elbit revealed its SkEye wide-area persistent surveillance (WAPS) system, already in service with Brazil on a Hermes 900 unmanned air vehicle. SkEye is similar in concept to the US 'Gorgon Stare' payload and uses multiple visual and infrared detectors to provide a complete high-resolution 'mosaic' video picture of some 80 km2 from a platform flying at 25,000-30,000 ft, which can be accessed by up to 10 different users.

Ukraine/Saudi JV revealed

The Antonov An-132D made its international debut at the Paris Air Show, following the aircraft's first flight in March in Ukraine. The aircraft – developed by Antonov and Saudi Arabia's Taqnia and King Abdulaziz City for Science and Technology (KACST) – has been developed as a modernised, westernised version of the Antonov An-32 'Curl', featuring new Pratt & Whitney PW150 engines, Honeywell avionics, and Dowty R408 propellers.

Dr Alexander Los, Antonov VP and Design Head, said the new design has retained the cross-section and ramp of the original Antonov An-32. In addition to cargo missions, the aircraft can be equipped to carry 75 troops, 46 paratroopers, or 27 wounded patients on stretchers. It has a maximum payload of 9.2 tonnes, with the company trying to position it as an alternative to the Leonardo C-27J Spartan and Airbus C295W.

UK eyes naval exports

The UK government is expecting to see an increase in naval exports in the coming years, as major new projects begin to mature. Stephen Phipson, head of the UK government's Defence and Security Organisation (DSO) within the Department for International Trade, said that as programmes such as the Type 26 Global Combat Ship being to mature, other countries are looking to join the group of operators. "We see a platform like Type 26 being seven years ahead of the competition like FREMM in terms of design, so as these things mature, we see customer requirements are also aligning.

The second flying prototype of Embraer's KC-390 tanker-transport aircraft performed daily as part of the show's flight schedule. Delivery of the

Stratobus

first KC-390 for the Brazilian Air Force, which has 28 on order, will take place next year.

Textron Systems unveiled the new Nightwarden tactical unmanned aerial system (TUAS). The Group 3 system has a payload of up to 59kg, and a maximum take-off weight of 340kg.

Textron's Unmanned Systems SVP and GM, Bill Irby, said the payload capability allows it to carry equipment such as communication relay, sense-and-avoid, electronic attack, signals intelligence, and communications intelligence, with up to 2,000 watts available for powering on-board subsystems.

Leonardo unveiled its M-345 High Efficiency Trainer (HET) jet trainer and M-346FA (Fighter Attack), a light attack version of the M-346 trainer.

The M-345 HET is touted as an affordable jet training aircraft by Leonardo, which has designed to compete with high-end turboprop training aircraft by offering comparable operating costs while providing better performances.

The M-346FA is the latest iteration in what is now billed the "M-346 family concept", which also comprises the M-346AJT (Advanced Jet Trainer) and the M-346FT (Fighter Trainer).

Emanuele Merlo, VP programme and contract management, M-345, said the Italian Air Force and other undisclosed customers will acquire the M-345 HET.

Merlo said Leonardo sees strong potential for the aircraft in several regions, including Asia-Pacific, and the Philippines in particular, which still flies the S-211, on which the platform is based.

International F-35 programme

After much deliberation of 'will it, won't it?' leading up to the event, Lockheed Martin's F-35A Lightning II Joint Strike Fighter (JSF) made its Le Bourget debut. Following the type's debut at Farnborough Air Show last year, the US Air Force dispatched a pair of its conventional take-off and landing (CTOL)-variant F-35As, though service commitments meant they were flown by industry rather than military pilots.

The United Kingdom is the only Tier 1 partner in the international F-35 programme, so the aircraft's eventual appearance at Farnborough was always assured. However, France is not a partner.

General Atomics Aeronautical Systems, Inc. (GA-ASI) displayed an Advanced Cockpit GCS at Le Bourget. The company also produces a variety of ground control stations and sensor control/image analysis software, offers pilot training and support services, and develops meta-material antennas.

Elbit Systems revealed an innovative wide area persistent surveillance

Embraer E195-E2 jet

solution - SkEye WAPS. SkEye WAPS persistently observes and records a wider area than ever before and offers systems users the ability to select real-time or back-in-time video footage within the covered area without being limited to a single segment. Developed to address requirements raised by defence and law enforcement agencies, responding to natural disaster recovery events, terrorism and homeland security threats, SkEye WAPS comprises advanced capabilities in the field of imagery intelligence gathering, providing a complete high-resolution picture and up to 80 square kilometer coverage of the Area of Interest (AOI) to a large number of users.

Check the new tech

France's Nexter presented its Caesar 6x6 and 8x8. This howitzer, equipped with a Caesar artillery system, is the result of Nexter's know-how in the artillery field. Currently deployed in Iraq, the Caesar has participated in almost all recent French Army overseas operations. It also equips the land forces of four other countries, including Indonesia, and soon Denmark.

A 155 mm / 52 calibre artillery system mounted on a standard truck, the CAESAR provides exceptional firepower and is easy to move and deploy in the theatre of operations thanks to tactical, operational and strategic mobility: It can drive on difficult terrain or on the road (including very winding roads) and can be transported by train, landing vessel, C-130 or A400M.

Leonardo introduced its new aerial target drone: the Mirach 40 (M-40) unmanned aircraft system (UAS), based on its Mirach 100/5 target drone, which earned a place as the standard threat simulator of international armed forces, including France, Italy, and the UK.

The M-40, a remotely-piloted aerial system (RPAS), supports Armed Forces training by simulating a range of airborne threat targets. Able to convincingly mimic a variety of aircraft and missiles, the target drone can simulate radar, infrared (IR) and visual threats. It enables Armed Forces to 'shoot down' the reusable M-40 in realistic scenarios, allowing them to train with and qualify a wide variety of weapon systems.

EUROFLIR-410 Ultra-long-range electro-optical system

The 53rd International Paris - Le Bourget Air Show, the world's biggest aerospace fair, organised by the SIAE, a subsidiary of GIFAS, the French Aerospace Industries Association, will be held from 17–23 June 2019.

Reference Text/Photo:
www.siae.fr

A400M and H130 at the static display

BAE Systems and Leonardo to Collaborate on Precision-Guided Munitions

BAE Systems and Leonardo have announced an initiative to pursue collaborations on new precision-guided solutions that will offer the U.S. and allied military forces a range of low-risk, cost effective, advanced munitions for advanced, large calibre weapon systems.

The two companies anticipate offering new adaptations of Leonardo's Vulcano — a family of gun-launched munitions that exceed the performance of currently available precision-guided projectiles — in a variety of gun systems, including the BAE Systems-built Advanced Gun System (AGS) and the Mk 45 naval gun. The AGS is currently on board the U.S. Navy's Zumwalt class of destroyers, and the Mk 45 is widely used by the Navy and allied nations.

VULCANO PGM

The new adaptations of Vulcano will also focus on providing solutions for land-based 155-mm artillery systems, including all variants of the M777 and M109 howitzers for the U.S. military and allies around the world. In testing, the 155-mm Vulcano achieved launch accelerations that support maximum engagement ranges similar to distances required for the former Long Range Land Attack Projectile (LRLAP) programme. The Mk 45 naval gun offers the potential to fire the 5-inch Vulcano at 20 rounds per minute to a maximum range over three times greater than existing munitions.

As part of this effort, BAE Systems and Leonardo will also explore offering an enhanced guidance and navigation unit.

Orbital ATK to Repair Trainer Aircraft for Iraqi Air Force

Iraqi Air Force

Orbital ATK has received a contract from the U.S. government to repair trainer aircraft for the Iraqi Air Force to continue their security mission. The trainer aircraft include 12 Cessna 172 Skyhawks and five Cessna Caravans.

"Orbital ATK has a proven track record of supporting the Iraqi Air Force and we are honoured to further aid them with this latest contract," said Cary Ralston, Vice President and General Manager of the Defense Electronic Systems Division of Orbital ATK's Defense Systems Group.

Since 2007, Orbital ATK has supplied the Iraqi Air Force with three armed aircraft (AC-208B), three reconnaissance aircraft (RC-208B) and five trainer aircraft (TC-208B). The operational readiness of the aircraft since the initial fielding continues to be outstanding. Additionally, Orbital ATK has continuously provided in-country maintenance, logistics support and student training on the missionized Caravans.

The AC-208 Eliminator is the newest addition to Orbital ATK's Special Mission Aircraft product portfolio, which provides affordable, battle-proven, responsive and advanced capabilities to customer-preferred platforms.

L3
to Supply U.S. Army with Mortar Fuzes

L3 Technologies recently announced that it has received an initial $89.2 million firm-fixed-price contract award from the U.S. Army to supply M783 Point Detonating/Delay (PD/DLY) Mortar Fuzes and M734A1 Multi-Option Fuze for Mortars (MOFM). This is a multi-year contract with a base award and four option years, which, if fully exercised, has the potential to exceed US$230 million.

"This award strengthens our long-term partnership with the U.S. Army," said Todd Gautier, President of L3's Electronic Systems business segment. "The advanced capabilities of these mortar fuzes deliver unsurpassed safety, performance and reliability to the warfighter. We are proud to have delivered these fuzes to the Army for the past 20 years."

The M783 and M734A1 fuzes are the U.S. Army's next-generation, NATO-standard electronic fuzes for mortars and are used to support close range, indirect fire support to infantry units in combat operations. Work will be performed in Cincinnati, Ohio, by L3 Fuzing & Ordnance Systems (L3 FOS), which is part of the Precision Engagement Systems sector within Electronic Systems.

Hellas Sat 3/Inmarsat S Communication Satellite Successfully Launched

Hellas Sat 3/Inmarsat S EAN telecommunication satellite, has been successfully launched by Arianespace on board an Ariane 5 rocket from Kourou launch pad in French Guiana. This condominium satellite for Inmarsat and Hellas Sat (an Arabsat subsidiary) will provide Mobile Satellite Services (MSS), Fixed Satellite Services (FSS) and Broadcast Satellite Services (BSS).

The Inmarsat S EAN payload will deliver communication services in the S-band to support Inmarsat's European Aviation Network, an integrated satellite and ground network that will deliver robust, high capacity inflight broadband for airline passengers across Europe.

The Hellas-Sat 3 payload will deliver in-orbit backed up DTH and Telecom services in its designated coverage areas, maintaining and expanding Hellas-Sat business reach with additional capacities and bringing video content in High Definition and Ultra High Definition format to the covered regions. The FSS/BSS coverage zones are Europe, Middle East and Sub Saharan African countries, including a cross trap service between Europe and South Africa.

Built on the Spacebus 4000 C4 platform from Thales Alenia Space, Hellas Sat 3/Inmarsat S EAN will deliver a S-band multi-beam mission for Inmarsat, as well as a powerful Ku/Ka-mission of 47 Ku-transponders (Beginning of Life), 44 Ku-transponders (End of Life) and 1 Ka-transponder for Hellas Sat. Satellite launch mass is around 5.8 tonnes, with a payload power around 12.7kW. It will be positioned at 39° East.

Sikorsky to Build Black Hawk Helicopters for U.S. Army

The U.S. government and Sikorsky, a Lockheed Martin company, recently signed a five-year contract for 257 H-60 Black Hawk helicopters to be delivered to the U.S. Army and Foreign Military Sales (FMS) customers. The "Multi-Year IX" contract for UH-60M Black Hawk and HH-60M MEDEVAC aircraft marks the ninth multiple-year contract for Sikorsky and the U.S. government for H-60 helicopters. The contract value for expected deliveries is approximately US$3.8 billion and includes options for an additional 103 aircraft, with the total contract value potentially reaching US$5.2 billion. Actual production quantities will be determined year-by-year over the life of the programme based on funding allocations set by Congress and Pentagon acquisition priorities. The deliveries are scheduled to begin in October of this year and continue through 2022.

The UH-60M/HH-60M helicopters are the latest and most modern in a series of Black Hawk variants that Sikorsky has been delivering to the Army since 1978. They provide additional payload and range, advanced digital avionics, better handling qualities and situational awareness, active vibration control, improved survivability, and improved producibility.

"Four decades of production, strong programme execution and delivery on behalf of the warfighter, coupled with great affordability for the taxpayer, have been the cornerstones of this programme," said Sam Mehta, President, Defense Systems and Services, Sikorsky.

Saab signs contract to upgrade Swedish corvettes

Saab has recently signed a contract with the Swedish Defence Materiel Administration (FMV) for the modification and upgrading of the Swedish Marine's Gävle-class corvettes. The order value amounts to BSEK 1.249 and the work will be carried out during the period of 2017-2020.

The contract states that Saab is to conduct a life extension of two corvettes, HMS Gävle and HMS Sundsvall, both of the Gävle-class. The contract also includes that Saab will conduct a general inspection after the ships have been in service for 72 months. Besides this, the contract also includes that the ships will be modernised with a new, advanced combat system.

"We have a long experience in building and maintaining corvettes in steel, aluminium and in composite. The ships have good operational capabilities, high availability, long service life, and low operating costs. With a new, advanced combat system, the ships will be modernised to meet the customer's demands", says Gunnar Wieslander, Senior Vice President and Head of Business Area Kockums.

The work will be conducted at Saab in Karlskrona and in Järfälla within the two Business Areas, Kockums and Surveillance.

Honeywell offers Connectivity to first Helicopter Flight around the World

Honeywell's advanced Connected Aircraft satellite communications products and services recently connected a Bell 429 helicopter during Canada's first helicopter flight around the world. The Canadian father-son team used Honeywell's Aspire 200 Wi-Fi system and GoDirect Cabin Connectivity services to share their planned 37-day journey and stayed connected from the air everywhere in the world, including over cities, mountains and oceans.

The C150 Global Odyssey team of Bob and Steven Dengler embarked on their trip on July 1, to celebrate the 150th anniversary of Canada's confederation. The tour kicked off at the Canada Aviation and Space Museum in Ottawa before making more than 100 stops in 14 countries.

The Aspire 200 system, with its High-Data Rate software package, brought high-speed, high-bandwidth Wi-Fi capabilities to the helicopter. With Honeywell's Aspire 200 and GoDirect Cabin Connectivity, plus highly reliable data connectivity through Inmarsat's global L-band satellite constellation throughout the tour, the team experienced Wi-Fi speeds of up to 350 Kbps per channel. These speeds enabled real-time uploads to social media, video-conferencing capabilities, and access to updated weather information along their journey.

"Connectivity on helicopters is often spotty and inconsistent because the rotor blades that power the aircraft disrupt connections to satellites. This makes maintaining high-speed, reliable connectivity on global journeys very challenging. Honeywell's Aspire 200 and connectivity enabled us to share photos and videos of our adventure from the air, but also provided real-time data to manage mission risk as we flew, greatly enhancing our safety no matter where we travelled," said Bob Dengler, pilot, C150 Global Odyssey.

INFIRNO: An Advanced, Innovative, yet Affordable Sensor System

By Sakha Pramod

INFIRNO is a high definition (HD), precision targeting and ISR sensor system that is applicable across ground, airborne and maritime platforms. Developed through Lockheed Martin's investment, this 15-inch innovative multi-spectral targeting sensor features high-definition mid-wave infrared and color sensors, advanced image processing, multi-target tracking, laser designator/rangefinder and geo-location capabilities. The system enables users to deploy laser-guided munitions and conduct long-range intelligence, surveillance and reconnaissance missions (ISR).

INFIRNO's real innovation comes from a unique approach that combines performance with affordability.

This month, Nation Shield sat down with Paul Lemmo, Vice President of Fire Control/SOF CLSS at Lockheed Martin Missiles and Fire Control, to learn more about this advanced and affordable technology.

Thanks for sharing more about this technology. Tell us more about INFIRNO and what sets it apart?

INFIRNO is a truly innovative system that benefits from lessons we have learned from designing and manufacturing more than 11,000 electro-optical and infrared sensor systems, such as the Sniper Advanced Targeting Pod, Apache Fire Control System, and AH-1Z Target Sight System.

Unlike some of the conventional mid-size turreted sensor systems that require customers to keep entire spare systems on hand, INFIRNO introduces a truly modular remove-and-replace concept to the mid-size turret market. Users can perform maintenance in the field without removing the turret from the host platform. They simply remove and replace any of the modular components that make up the INFIRNO system.

What is your role in INFIRNO's development?

We developed INFIRNO through internal investment and are continually improving the system by adding new capabilities, such as a recently added infrared pointer.

I understand INFIRNO can be quickly repaired using spare LRUs instead of removing the entire sensor from the host platform. Can you quantify the cost savings?

INFIRNO incorporates a two-level maintenance and Line Replaceable Unit (LRU) concept used in Lockheed Martin's Sniper Advanced Targeting Pod. Based on independent DoD models, INFIRNO's LRU design will reduce system life-cycle costs by 50 percent. During a recent field demonstration, we removed and replaced the system's laser and had INFIRNO back in operation in less than 10 minutes.

Compared to other offerings in this field, how does INFIRNO measure up?

This is the latest offering from Lockheed Martin's Fire Control sensors business. INFIRNO combines proven targeting capabilities of our Target Sight System and lessons learned from our low cost Gyrocam ISR sensors. More than 1,100 Gyrocam systems have been deployed with the US military, NATO forces and US and international law enforcement agencies.

Paul Lemmo, Vice President of Fire Control/SOF CLSS at Lockheed Martin Missiles and Fire Control

I understand you achieved the successful integration of INFIRNO on the Black Hawk helicopter; with

A possible configuration of the Armed Black Hawk with the INFIRNO multi-spectral targeting system

Sikorsky now part of Lockheed Martin, do you have plans to configure the Black Hawk with the INFIRNO?

Yes, we are working together to develop a sensor option for Black Hawk. Lockheed Martin showcased a possible configuration at the 2016 Farnborough airshow. The Black Hawk is a flexible and proven platform ready to meet customers' requirements for a variety of current and future mission sets.

If a customer ordered today, how quickly could you deliver INFIRNO?

INFIRNO leverages mature technology and production processes to support customer schedule requirements. Delivery dates will ultimately depend on the number of units ordered and customer needs, but we are ready to support our customers and their operational needs.

What user community do you believe would benefit from this capability the most?

INFIRNO is designed for combat reconnaissance, fire support and long-range precision strike missions. Users need a flexible multi-spectral targeting and ISR sensor that can adjust to meet new requirements and keep pace with technology and emerging capabilities, while at the same time being affordable and offering an innovative solution to reducing overall life cycle costs.

INFIRNO introduces a truly modular remove-and-replace concept targeting system

INFIRNO Flies on H-60 Black Hawk Helicopter

Last year Lockheed Martin successfully completed the first flight of the INFIRNO multi-spectral targeting sensor in a tactical configuration on an H-60 Black Hawk helicopter. The test was conducted to validate INFIRNO's performance and integration capabilities in a rotary-wing environment.

"This is the latest in a series of successful demonstrations of INFIRNO across multiple platforms," said Paul Lemmo, vice president of Fire Control/SOF CLSS. "The flight test proves INFIRNO's high-definition sensor performance and stability on an airborne platform."

The testing was funded by Lockheed Martin and conducted on a privately owned and operated H-60 Black Hawk helicopter. The aim was to prove ease of platform integration and sensor capabilities.

The flight team performed multiple system tests, capturing performance data up to altitudes of 6,000 feet and at speeds of 160 knots. The team also collected high definition video and tested INFIRNO's ability to identify and track targets in the demanding conditions inherent to rotary-wing aircraft.

More testing and customer demonstrations of INFIRNO are scheduled throughout 2017.

Additionally, INFIRNO is a possible configuration for the Armed Black Hawk. Lockheed Martin is ready to provide military operators the flexibility to add sensors and weapons to their Black Hawk helicopters according to export regulations.

Future Soldier: At the Forefront of Modern Warfare

In today's rapidly transforming armed forces, the infantryman continues to play a central role in new operational scenarios. Their mission spectrum is extremely complex, calling for capabilities enabling high-mobility operations in difficult, unfamiliar terrain, even when dismounted.

Often, the infantryman has to operate in urban areas and under extreme climatic conditions. They have to contend with new asymmetric threats, and frequently face attacks from irregular forces.

Moreover, infantry in modern airmobile and other special operations have to be able to carry out a multiplicity of highly diverse missions. This doesn't just require new force structures; it requires modern equipment specifically tailored to the task.

Advanced technologies can make a major contribution to improving the survivability, C4I capabilities, sustainability, mobility and lethality of modern military operations.

The important thing is to provide troops with an open infantry system based on modular combat equipment and deliver enhanced performance and reduced weight. And it isn't just with regard to weight that there is a need to avoid overburdening the soldier: equipment should be easy to use even under tough field conditions.

A modular design ensures operational flexibility and the ability to adapt to new situations and mission requirements. Moreover, modular equipment can be used in multiple ways–including by other branches of the military.

Meeting the infantry's need for high mobility requires an armed, airportable vehicle. An essential component of the total system, it can be armoured to improve the survivability of its occupants, and equipped with additional weapons for enhanced lethality.

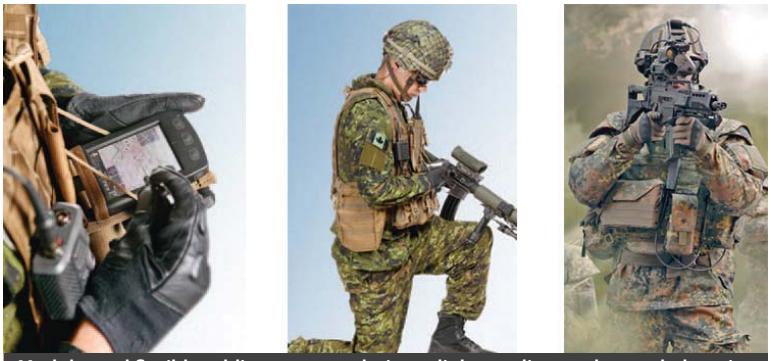
As a means of transport, it increases operational sustainability, enabling troops to carry more equipment while ensuring communications with the next higher echelon as well as a network centric warfare capability. Naturally, diverse missions and a high degree of specialisation call for the deployment of various vehicle systems.

More mobile, more effective

Keeping these needs of the soldier in mind, Rheinmetall has recently won a major order from the German Bundeswehr with a gross value of €370 million (net value: €310 million). The Düsseldorf-based tech group has been roped in to supply state-of-the-art "Future Soldier – Expanded System" (IdZ-ES) soldier systems to equip 68 infantry platoons. The contract signing ceremony recently took place at Germany's Federal Office for Bundeswehr Equipment, Information Technology and In-Service Support (BAAINBw) in Koblenz. The new systems will be delivered between 2018 and late 2020.

The modular Future Soldier – Expanded System, or IdZ-ES, brings dismounted infantrymen into the network-enabled warfare loop. Troops on the

Gladius is based on the IdZ-ES



Modular and flexible soldier systems solutions - light, medium and extended version

ground detect, recognise and identify targets, which they either engage themselves or by calling in additional fire support. Swift, precise, scalable engagement of targets is not only vital for force protection, it also protects the civilian population and helps to avoid collateral damage. The IdZ-ES has been in service with German troops in Afghanistan since summer 2013.

Since 2012, the Bundeswehr has procured three lots, a total of 90 systems, each of which is designed to equip a 10-man section or squad. The 68 platoon systems are enough to equip over 2,460 soldiers. Based on a holistic, "total infantry system" concept, the IdZ-ES integrates infantry and mechanised infantry platoons and their vehicles – specially equipped to serve as base stations – into the network-enabled warfare loop.

Meriting special mention is the core and helmet system. The battery-powered core computer – worn on the soldier's back and thus known as the "electronic backbone" – controls all the devices and sensors carried by the soldier via various interfaces. Its principal functions include power supply management, access control and monitoring, the soldier information system for map and situation display, navigation, reporting, exchange of reconnaissance

The "Future Soldier – Expanded System" has been in service with German troops in Afghanistan since 2013

and target data, processing sensor data (e.g. own position, line of sight), operator interfaces and visualisation as well as system configuration.

The soldier can control the Soldier Command System and communication via a manually operated control and display unit known by its German initials as the BAG. All relevant data concerning the current situation, the position of friendly forces (blue force tracking), the mission and system status are displayed either on the BAG or, alternatively, on the OLED helmet display. The modular battle dress uniform can be readily adapted to meet the current environmental and temperature conditions. Other important features include the ballistic body armour (Protection Class 1) with integrated ventilation shirt as well as a modular harness for carrying ammunition, ordnance, the electronic backbone and additional equipment.

The IdZ-ES protective vest comes complete with chest rig and hip belt; with added ballistic inserts, it offers protection up to German Level 4. The section or squad leader and his assistant are

both issued with an additional leader module consisting of a portable command computer operated via touch screen. A rifle-mounted push-to-talk button enables wireless communication even when the operator leader has raised his weapon. Furthermore, small arms can also be fitted with optical and optronic devices of the latest generation.

Rheinmetall is renowned for supplying its customers with made-to-measure solutions. The Argus soldier system, for example, is now being produced for the Canadian armed forces' Integrated Soldier System Project. Another international customer already uses a Gladius variant, which is based on the IdZ-ES.

From individual components to integrated systems based on operational requirements and doctrines, Rheinmetall offers flexible and scalable technology, a wide variety of command and control and display solutions, different levels of integration as well as variable vehicle integration, including Rheinmetall or third-party hardware and software.

Rheinmetall Defence has longstanding experience and expertise in networked-enabled operations and system integration. In particular, the Group's ability to develop seamless C2 system architectures based on international standards – from the individual rifleman up to brigade-level command posts – is essential for implementing soldier modernization programmes.

Advanced technologies make a major contribution to improving the five main capabilities of modern warfare – protection, lethality, command and control as well as mobility and sustainment. The company's goal is a well-protected soldier, equipped with integrated weapons, with a clear picture of the tactical situation and reliable means of communication.

The Rheinmetall soldier systems improve performance in all five-capability areas without overburdening the individual rifleman. The system is modular, resulting in reduced volume, weight and power consumption. This ensures greater operational flexibility and the ability to quickly adapt to new situations and mission requirements. The equipment is easy to use even under harsh conditions and in stressful combat situations when performance and low weight are paramount.

> The Argus soldier system, is now being produced for the Canadian armed forces' Integrated Soldier System Project

Reference Text/Photo:
www.rheinmetall.com

TAWAZUN TRAINING CENTER INTRODUCES NEW LEARNING INITIATIVES

Tawazun Training Center (TTC), had recently introduced a set of new learning and development programs especially designed to accelerate the professional development of the Tawazun Work Study Program (TWSP) students.

TTC was established to support Tawazun's mission of creating a generation of UAE nationals that is capable of, and proud to contribute to the country's developing industrial sector. By building these human capabilities, Tawazun seeks to ensure that the UAE has the human capital with the skills and expertise to meet today's – and tomorrow's – future industry challenges.
TTC currently conducts several training programs, including:

- **Tawazun Work-Study Program (TWSP):** aims to recruit highly qualified young Emirati students secondary school and develop them in to professional engineers who are ready to take up future positions within Tawazun portfolio of companies. TWSP is a unique program that combines university learning with actual work experience while enrolled in college. Tawazun enrolls students through a scholarship contract and they are assigned to the bachelor's program in UAE University. Apart from the regular classes at the university, the program involves training at partnering institute in Germany, training at Tawazun Training Centre and training in various subsidiaries of Tawazun.

- **Tawazun's Piling Program:** Tawazun Piling Program was launched in November 2012 with the aim to develop a pool of fresh Emirati engineers with high technical readiness that enables them to work in systems integration, product development, and Research and Development (R&D) projects in various companies under Tawazun. The program duration is about 10 months when run in a full day mode. The piling training curriculum is based on 20% theory and 80% practice. The program involves a capstone project in which the trainees practice the acquired skills and knowledge through realistically simulated engineering design environment.

- **MBA:** Tawazun partnered with United Arab Emirates University (UAEU) in 2012 and launched the unique and prestigious Master's Program in Business Administration (MBA), focusing on manufacturing excellence and leadership. This program was designed to develop managers and leaders who could spearhead the growth of manufacturing sector in the country. This program provides the participants with the knowledge and understanding required for managing and leading various manufacturing related activities in UAE. The program provides in-depth understanding of supply chain, inventory, production process, technology, quality system, marketing, logistic and the environment to the participants.

In addition to the professional and technical activities, TTC has been also focusing on organizing various social activities for the students and staff in order to build teams and enrich the team work and soft skills.

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TAWAZUN

Partnership Generates Benefits In Life Cycle Support Services

Patria is a strategic partner of the Finnish Defence Forces in the life cycle support services for the F/A-18 Hornet fighter aircraft. A strong base of Finnish expertise and capability are at hand to offer competitive, reliable and cost-efficient solutions that guarantees the safety and operational performance of the aircraft.

The company is the leading producer of life cycle support services for aircraft and helicopters in Northern Europe. It provides these services to, for example, the F/A-18 Hornet fighters of the Finnish Air Force.

"With Patria maintaining the aircraft for its part at optimal readiness and mission capability, the Finnish Air Force is free to focus on its core functions", says Harri Lampinen, head of Patria Aviation's Aircraft unit.

Life cycle support services cover lots of activities. They safeguard the operational readiness of fighters around the clock, every day of the year. On the other hand, they also secure the availability and operational capability of the fleet for the duration of its service life. For Finland's Hornets, this life span is 30 years.

"Thanks to the work share, the Air Force can concentrate on its own expertise which is flying", says HX Program Manager Seppo Pietiläinen from the Finnish Air Force.

Partnership holds also in times of crisis

The work share between Patria and the Finnish Defence Forces is clear. The Air Force is responsible for the use and operational level maintenance of the aircraft. The Finnish Defence Forces Logistics Command is responsible for purchasing the material required by the fleet.

Patria, on the other hand, takes care of a significant portion of scheduled maintenance, repairs and upgrades of the aircraft in accordance with the objectives and requirements set by the Finnish Defence Forces.

"The Air Force performs a small amount of scheduled maintenance itself to maintain its competencies and capabilities to operate in crisis situation", says Lieutenant Colonel (Eng.) Harri Korhonen from the Aircraft Branch of the Defence Forces Logistics Command.

Strategic partnership with the Defence Forces means that Patria's services are available in the event of crisis, during which the international partners' support may not be available.

Efficiency on the production line

The manufacturer of the Hornets, the Boeing Company, and the main user of the type, the US Navy, has participated in the design of the life cycle support services. Valuable expertise has accumulated in Finland over the years, which is vital with regard to security of supply.

"Our service also includes the possibility to change the manufacturer's original specifications if needed. For example, we have fine-tuned the Hornets' maintenance system to provide the optimal fit with Finnish conditions and the way of use of the aircraft by the Finnish Air Force," says Harri Lampinen of Patria.

The life cycle support services are designed so that repairs and upgrades can be performed simultaneously with the scheduled maintenance of the aircraft. The work is performed on the production line of Patria's Aviation business unit in Halli, Jämsä.

"This way the negative impact on the availability of the aircraft is effectively minimised. Furthermore, it is more cost-effective to perform all work at the same time period rather than having each plane brought in multiple times for different procedures", says Business Development Manager Juha Alanko of Patria Aviation's Aircraft unit.

Upgrade cycles

Mid-Life Upgrade 2 (MLU 2), was carried out on each of the 62 Hornets in 2013–2016

The life cycle support services of the Finnish Hornets have included two major life cycle upgrades performed.

The first, Mid-Life Upgrade 1 (MLU 1), was carried out for the entire fleet in 2006–2010. Among other things, the upgrade improved the Hornets' air-to-air combat capability by introducing the AIM-9X infrared missile and JHMCS helmet mounted cueing system. Map system was upgraded with tactical moving map capability, communication radios were upgraded and a new identification friend-or-foe interrogator/transponder was installed.

The second major upgrade, MLU 2, was carried out on each of the 62 Hornets in 2013–2016.

Through the upgrade, the aircraft implemented the air-to-ground capabilities enhanced performance and its capability to support joint operations between all services.

To support interoperability Link-16 data link system was installed. Link-16, listening targeting pod and upgraded cockpit displays improved the pilot situational awareness. Self-protection suite and other smaller updates improved the aircraft survivability. International civil aviation regulations required modifications to Hornets' navigation and communication systems.

The Hornets' new weapons include guided short-range JDAM bombs, medium-range JSOW glide bombs and long-range JASSM air-to-ground missiles.

"The MLU 2 upgrade is significant because the improvement in performance also supports the operations of the Finnish Army and the Navy," Lieutenant Colonel Korhonen of the Finnish Defence Force Logistics Command points out.

According to Lampinen, the MLU 2 upgrade was a challenging task, which also added new technical competence to Patria's offering.

"We also gained a lot of valuable experience of implementing large projects which require integrating of several systems", he states.

Focus on structural sustainment

MLU2 was the last major upgrade scheduled for the Hornets. In the coming years, the focus will be on the safe and cost-efficient use of the aircraft for the remainder of their service life.

The main focus will be on the studies in structural integrity of the airframes and on prevention and repair of possible structural damages.

"The fleet is ageing, and we begin to find more fatigue cracks in airframe structures. We need to find solutions securing the fleet service life safely and cost-efficiently," says Lieutenant Colonel Korhonen.

The Finnish Defence Forces define the objectives and requirements for the structural integrity, and Patria carries out the required studies and proposes the implementation alternatives.

Pietiläinen emphasises the fact that the structural integrity management of aircraft requires constant vigilance. The most important thing is to prevent any damage in advance.

"There is significant competence of aircraft structures in Finland, which has been complemented through cooperation with other countries flying the F/A-18 Hornets. We have gained a great deal of useful information on how the airframe structures should be strengthened and what modifications are required," Pietiläinen says.

The building up of life cycle support services for Hornets and the know-how required dates back to the acquisition and assembly phase of the Hornet project, carried out at Patria's production facility in the 1990s.

Reference Text/Photo:
www.patria.fi

DCI: Offering tailor-made services in defence for over forty years

The French Defence Ministry's benchmark operator for transferring French military know-how abroad to the benefit friendly armies, the Défense Conseil International (DCI) group has been involved across the entire spectrum of defence and security for more than 40 years. Holding the "French Armed Forces Training" label, DCI is offering tailor-made services in the fields of consulting, training and technical assistance.

DCI group has its headquarters in Paris with several sites all over the national territory. It also has permanent offices abroad, in particular in the Middle East with Qatar, Kuwait, United Arab Emirates and Saudi Arabia, and in South East Asia with Malaysia and Singapore and more recently in India. DCI is pursuing its international development with innovative services with high added value while developing new partnerships in Asia and Latin America.

Taking the lead in Malaysia

In a recent major tie up, in order to rapidly develop the up-to-date capacities of Helang Flying Academy in Malaysia, DCI is investing in world-class training tools: four EC120 helicopters and a FNTP II simulator. Several MoUs and letters of intent have been signed with industrial partners to ensure the swift development of the first regional helicopter training centre in Malaysia.

DCI is thus demonstrating its capacity for rapid international outreach tailored to the expectations and needs of France's partner countries.

"The creation of Helang Flying Academy indeed reflects a change in the practices of the countries we support and have supported for 45 years in some cases", says Jean-Michel Palagos, CEO of DCI. "Our long-standing expertise in Asia, our strong network of partners and our ability to offer innovative solutions make DCI a leading player in supporting foreign armed forces as they build a real capacity-based approach."

The FNTP II simulator by Entrol - a key element for complex training

Helang Flying Academy will also acquire a FNTP II simulator supplied by Entrol. By selecting Entrol, Helang Flying Academy is offering trainees the latest equipment in terms of training engineering and technology, a key element for complex training. The FNTP II simulator allows training in real conditions in a digital environment that perfectly complements in-flight training and offers practice sessions at reduced cost.

General Aviation Safety Training pact inked

At the 2017 Paris Air Show, the French Institute for Aviation Safety (IFSA), which is a DCI training centre, and the

French Defence Air Accident Investigation and Safety Board (BEAD Air) signed an agreement to explore potential synergies to reinforce general aeronautical safety in training and simulation for air accident investigations.
The IFSA, which was created 30 years ago and is internationally recognized in the prevention and investigation of aviation accidents, participates in the training of the BEAD Air personnel. This agreement is an acknowledgement of the quality of that training. The IFSA is the only institute of its kind in France. Beyond its contribution to the training of official French accident investigators, the IFSA trains official investigators of several nationalities in French, English or Spanish. French companies with activities in the defence sector, like Airbus, ATR, Safran and Dassault, also use the services of IFSA.

IFSA celebrates 30th anniversary

Founded in 1987, the IFSA, a DCI training centre, is celebrating its 30th birthday this year. The Institute aims to promote French expertise in safety and investigation and has become a benchmark player in both civil and military aviation safety training, particularly in France. IFSA instruction is recognised by major international organisations, including the International Civil Aviation Organisation (ICAO), the Flight Safety Foundation (FSF), and the International Society of Air Safety Investigators (ISASI).
IFSA trains state investigators from various African, European, Asian, Middle-Eastern and more recently American countries. French defence industrialists, including Airbus, ATR, SAFRAN and Dassault, also use the Institute's services.

DA42, is an appropriate teaching aid for close air support in a complex environment

DCI is committed to excellence in training

"The classrooms of our aviation profession training centres – CIF-AA, CIF-H, and the French Defence Aeronautical Institute (FDAI) – have been fully renovated and are now all up to 'Next Generation' standard. The centres also provide each trainee with portable computer tools, particularly so that they can be given assistance during revision periods. This support enables us to report an almost 100% success rate, the key to the trusting relationship we have had with France's partner countries for 45 years", according to Palagos.
Because trainee success is part of DCI's DNA, the company has indeed invested extensively to modernise its training tools. Simulators have also been put in place to improve understanding and facilitate and speed up the transition to hands-on application. One of these simulators, purchased from the French company Price Induction, offers dynamic 3D viewing of how a reactor works with the possibility of simulating its performances in real time based on very realistic scenarios. Another digital station, developed by the same company, serves to illustrate certain complex teaching modules, based on computer graphics animated by the instructor or by the students themselves.

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UAVs: From Coordination To Cooperation In Europe

By: Jean-Michel Palagos, Chairman and CEO of DCI

What if UAVs were the key to future European defence cooperation?

In 2013, the former High Representative of the Union for Foreign Affairs and Security Policy, Catherine Ashton, identified four priority sectors to boost European defence cooperation. One of these was to promote the development of MALE (Medium Altitude Long Endurance) UAVs on a European level. This objective, now becoming reality, would rely on cooperation among EU countries in this rapidly expanding sector.

Working together thanks to a generic system

European countries which are equipped with operational UAV technologies and which are present on the same theatre of operations already coordinate their actions on the ground in advance, e.g. by distributing surveillance zones. We are about to reach a new milestone. Cooperation between Défense Conseil International (DCI), the team leader, and Diginext has convinced the European Defence Agency (EDA), which has contracted us to develop, deploy and deliver a simulation demonstrator for training MALE UAV operators. Nine countries are involved: Belgium, France, Germany, Greece, Italy, the Netherlands, Poland, Spain and the U.K.

Thanks to the Diginext UAV-X simulator, a generic system that can simulate any type of UAV (MALE or tactical), and DCI's training know-how, cooperation between these nine countries is thus reinforced. The distributed simulation system available in these countries can be used to perform joint exercises and training via a network. The objective is not to train the armed forces of these countries to use one particular UAV, but to teach them to work together, which is possible thanks to this generic system. This is why the approach is so original. Delivery of the first two machines, to France and Italy, is scheduled for October 2017. The others will follow by the end of 2018. On completion of the programme, all nine countries will have received their machines.

A European UAV community by 2018

Beyond this radical change of perspective, this project contributes to the creation of a real European UAV community, which will be materialised on different levels.

The community of MALE UAV experts currently operates according to a collaborative model based on exchanges before or after an exercise or mission. With this distributed simulation demonstrator, the objective is real-time operational cooperation. Users in the different countries will learn to work simultaneously on the same scenario, in the same environment. This will help to harmonise training of European experts and users.

On an operational level, the ultimate goal is to have different UAVs operating in a network on the ground, with the capability to exchange information and tasking orders in order to enhance performance. Looking further ahead, we can imagine that this project could provide a basis for specifying the characteristics of a European MALE UAV to equip the different armed forces of European Union member countries.

The programme also responds to a desire for increased interoperability in a sector whose importance is growing daily. Just as signing up to NATO or the Common Security and Defence Policy has led member countries to agree on common operating rules for their air forces, this cooperation will make it possible to establish and validate procedures for the operational employment of MALE UAVs. Ultimately, one could imagine the emergence of a European doctrine for UAV operations. In this way, the project represents a first step towards more structured, permanent cooperation in the UAV sector.

PUREPOWER® PW800: Game-Changing Technology

The PurePower PW800 engine is the next step for business aviation. Thanks to its game-changing technology built on proven engineering, best practices and the combined expertise of P&WC and Pratt & Whitney, it is able to provide everything a large business jet operator could ask for and more, with world-class performance, efficiency, reliability and sustainability.

The PurePower® PW800 engine is as transformative as the Gulfstream G500 and G600 business jets it will power. Based on Pratt & Whitney's geared turbofan core technology, the PurePower® PW800 introduces business aviation to new levels of engine performance and efficiency. The new technological and design enhancements reduce scheduled maintenance by 40% and inspections by 20%, and allow many line replaceable components to be replaced in less than 30 minutes.

At the heart of the PurePower PW800 is the durable, rigorously tested core technology shared with Pratt & Whitney's award-winning PurePower Geared Turbofan™ commercial aircraft engines. A key feature of this technology is its state-of-the-art all-axial core architecture, which enables the high operating pressure ratios and best-in-class efficiencies needed for high-speed heavy business jets.

The engine delivers benchmark fuel efficiency, improving on the previous generation of engines in the same thrust class by over 10%. This is due to the combined effect of the core technology, high bypass ratio, lightweight, sustainable materials and parameter control offered by the full authority digital engine control (FADEC) system. Equally impressive is its best-in-class power-to-weight ratio, achieved thanks to optimal integration of the engine and nacelle systems with the aircraft. What's more, the design minimizes the engine's weight through the extensive use of lightweight composites and leverages advanced technologies such as additive manufacturing and integrally bladed fans to ensure maximum performance.

Thoughtfully Designed

The PurePower PW800 is optimized to provide a benchmark passenger experience, as the low-noise design and low vibration levels make for an exceptionally quiet cabin. With a predicted 99.99% dispatch reliability, the robust powerplant design will provide best-in-class dependability, providing peace of mind for owners, operators, pilots and passengers alike. It accomplishes all this while setting a new sustain-


PurePower PW800 is quietest engine in its class

ability standard. From low emissions to minimizing materials of concern to an advanced combustor that exceeds green engine standards, every element has been meticulously designed with the environment in mind. The engine clears Federal Aviation Administration community noise requirements by a double-digit margin, making it easily the quietest engine in its class.

Premium Customer Experience

Introduced at the end of 2015, the ESP® PurePower® PW800 engine service plan is one of the most comprehensive packages ever offered in the industry: a premium, white-glove experience tailored to owners' and operators' precise needs. The engine is supported by one of the industry's most extensive service networks, with facilities around the world and Mobile Repair Teams ensuring prioritized, rapid, seamless support by dedicated, fully trained staff.

Take A Peek Behind-The-Scenes

While the innovations are gaining most of the headlines, some of P&WC's greatest achievements on the PurePower PW800 are happening behind the scenes, where the company is readying itself for entry into service.

Already, parts, tooling and rental engines are moving to key locations around the world to ensure that equipment is available from day one, when the PurePower® PW814GA engine-powered G500 enters into service. Additional tooling and inventory is also being prepared to support those regions with the highest demand.

"We are looking at where the customer will be based and where our key hubs are located to see how we can work with Gulfstream to assess locations that best serve their customers to deliver seamless service," Tania Petrov, Customer Manager for the PurePower® PW800.

Comprehensive Training

P&WC's field support representatives (FSRs) and mobile repair teams (MRTs) also are readying for that first delivery and are currently being trained on the nuances of the PurePower® PW800 engine, such as its single-piece fan and larger access panels. Training is also available through new technologies, such as Librestream's Onsight software, a mobile collaboration tool, which will help P&WC offer real-time customer service to PurePower® PW800 operators.

Training extends to the dedicated teams in Montreal and Toronto, who will be equipped and trained on new advances in customer service, such as an integrated troubleshooting tool that combines the engine and aircraft database into one easy-to-use service.

Borescope inspection: a new mobile solution to get remote expert help

Borescope inspections are an important aspect of engine maintenance that facilitate diagnosis and promote preventative care. A new technology now gives you quick and free access to P&WC's experts when you need professional help.

Known as Onsight, the new mobile solution provides you with technical expertise virtually and in real time to help keep your aircraft and engine operating smoothly and without delay.

"With Onsight, you have a two-way audiovisual link that's secure and encrypted to easily collaborate with our engineers, field support representatives (FSRs) and Customer First Centre (CFirst) technical experts," says Jeremy Murray, Field Operations Regional Manager, P&WC Worldwide Support Network.

Brand New Features to be Launched at Dubai Airshow 2017

The new features taking place at the Dubai Airshow 2017 include new sector specific pavilions, Space Pavilion, UAV Summit, Cargo Zone, and the return of Airport Solutions. These launches are set to bring focus to new market sectors when the show opens in November.

The Space Pavilion and conference in particular is shaping up to be a key feature of the event, produced in partnership with the UAE Space Agency. Space exploration is a national priority for the UAE and this new feature has been developed to support the government's strategic objectives of building the region's space sector. Exhibitors from around the globe are keen to be part of this growing market with Spanish Aistech and Russian Reshtenev among those already committed to exhibiting.

With the Middle East UAV market growing rapidly, both in terms of the number of UAVs operating in the region and also the increasing investment in manufacturing, the Airshow will feature a UAV pavilion and conference this year. The UAV Summit will include conference sessions with industry leading experts, flying display and the UAV exhibition zone.

The introduction of the Cargo Zone at the Dubai Airshow comes at a time when Al Maktoum International Airport now hosts the world's largest cargo operations, boosting Dubai's claim to transform into a key regional hub with a capacity to handle more than 12 million tonnes of cargo annually.

Airport Solutions Dubai, part of the Airport Solutions Global Series, will also feature at the show, bringing together the entire airports and aviation buying chain from manufacturers, airport operators, developers, regulators and investors, through to end users. Featuring a two-day programme, the conference will offer leading airport developers and suppliers the exclusive opportunity to interface with airports and aviation leaders on the demand side of the growth equation.

Spotlight on business aviation sector

The business aviation sector will be well represented at the Airshow, as many key players are keen to maximise their exposure in to the region's growing opportunities. The industry has already established its commitment to the show in previous years, with 2017 looking to be no exception.

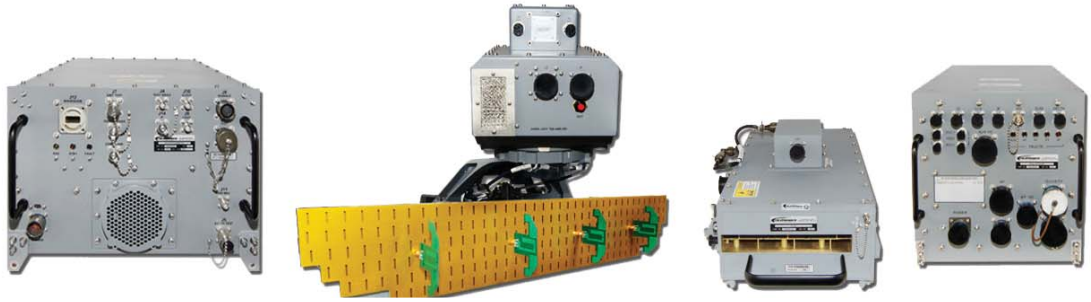
Already committed to attend the November event at DWC, Dubai Airshow Site are business aviation heavyweights including Gulfstream, Embraer and Dassault Aviation, in addition to some UAE based players, Sonic Jet and Falcon Aviation and those travelling from Europe and the U.S.

Bombardier Business Aircraft market forecast predicts 350 deliveries valued at US$12 billion over the next 10 years, with medium and large category aircraft accounting for about 95 per cent of these deliveries, while Boeing Business Jets has stated that the Middle East represents roughly one third of their business.

With 12 per cent year-on-year regional growth reported, Middle East & North Africa Business Aviation Association (MEBAA) Founding & Executive Chairman Ali Alnaqbi is confident that demand for the sector from across the region will continue to rise.

"Currently, the market is still favouring wide-body aircraft. Demand for mid-size and small size is there too. With increased demand from our members to be present at the Dubai Airshow in order to meet the big players, we can push the agenda under the MEBAA umbrella," he was quoted saying.

OceanEye Offers Versatile Surveillance Solutions For Maritime Missions



APS-143C(V)3 OceanEye maritime surveillance radar **System**

As maritime operations continue to evolve, the need for high-performance maritime surveillance radar remains a critical component of mission success. With a 80-plus year history as an advanced technology leader, Telephonics' is focused on creating cutting-edge technologies for the aerospace, defense and commercial markets.

Telephonics' APS-143C(V)3 OceanEye maritime surveillance, imaging and tracking radar system supports surveillance missions around the globe. OceanEye is versatile enough to fly on rotary or fixed-wing aircraft and has a broad set of maritime long-range target search, detection and tracking modes in high-sea states. With an optional Identification Friend or Foe (IFF) interrogator, OceanEye also features Inverse Synthetic Aperture Radar (ISAR) and overland Synthetic Aperture Radar (SAR) imaging, weather avoidance and Search and Rescue Transponder (SART) beacon modes.

OceanEye's open-architecture design facilitates software and firmware updates, making it well-suited for maritime tactical missions today and well into the future. It features a three-box system comprised of a Receiver/Transmitter (R/T), Signal Processor (SP) and Antenna/Pedestal (A/P). It offers a cost-effective radar solution for several missions, including Anti-Surface Warfare (ASuW), small target detection, Search and Rescue (SAR), SART beacon detection, long-range maritime surveillance and classification, contraband control and drug interdiction, coastal protection and boarder surveillance.

The AN/APS-153(V) multi-mode radar was designed and developed to meet the challenges of the maritime military helicopter environment, providing rugged, lightweight, low-prime power, extremely small target detection, high-resolution imaging and long-range search functionality. Radar operators can classify detected moving ship targets at night and restricted visibility using the high-resolution ISAR mode. This mode allows the user to operate outside of visual and lethal range of potential enemies and to identify detected targets when images are combined with other intelligence.

An IFF interrogator is integrated internally into the AN/APS-153(V) Weapons Replacement Assembly (WRA) saving valuable weight and space and the system's signal processing provides the upgrade flexibility needed to meet the challenges of the future. New or enhanced modes of operation offering potential for improved situational awareness and mission effectiveness include Low Probability of Intercept (POI), ISAR automatic classification aids, SAR, Mode 5/Mode S and weather. It offers automatic detection and tracking with built-in global land mass rejection capability that reduces operator workload in blue water and the littorals with low false alarm rates, frequency agile waveforms covering 460 MHz bandwidth that enhances detection and reduces false returns, high-range resolution with duty cycle pulse compression waveforms and more.

Telephonics is renowned for developing rugged, lightweight, powerful solutions that meet the challenges of the dynamic maritime environment. The company's innovative and agile engineering team strives to advance surveillance technologies that are progressively smaller, faster, lighter and more powerful to meet the ever-evolving needs of today's modern mission landscapes.

MUSS Provides Reliable Protection Against Guided Weapons

MUSS self-protection system on top of the "Puma's" turret

The new sensor house HENSOLDT recently delivered the 200th equipment set for the Multifunctional Self-protection System (MUSS), which is to be integrated into the German Army's new Puma infantry fighting vehicle. Thus, deliveries currently amount to 1,000 components, comprising 800 sensor heads and 200 central units. HENSOLDT is under contract to deliver approximately 350 MUSS equipment sets to Krauss-Maffei Wegmann and Rheinmetall.

"Protection systems like MUSS are opening up enhanced possibilities for protecting armoured vehicles from attacks, as is already the case for aircraft or helicopters," said Thomas Müller, CEO HENSOLDT. "Compared to hard-kill solutions, we are able to increase the protection level considerably without risking collateral damage around the vehicle."

MUSS drastically reduces the likelihood of a hit by antitank guided missiles or laser-guided ammunition and operational soft-kill active protection system for ground vehicles worldwide. It achieves a level of protection, which is not possible for the same total weight with passive armour while avoiding collateral damage.

Each MUSS system consists of four warning sensors, a central unit, an infrared jammer head, jammer electronics and a novel alignable smoke grenade launcher. The warning sensors detect approaching missiles and laser beams aimed at the vehicle. The central unit activates an infrared jammer, which interferes with missiles' guidance systems, and/or initiates the use of pyrotechnic countermeasures.

An active protection system like MUSS defeats threats before they strike a ve-

hicle, by sensing them and providing a 'soft' response based on jamming or obscuration of the guidance mechanism with no risk of collateral damages. Moreover, MUSS is a discrete solution, which has no significant influence on the vehicle radiation as it features only passive sensors and an infrared Jammer with short activation time, not detectable either in visible or in thermal image spectrum.

HENSOLDT delivers major components for the electronic self-defence systems of the Eurofighter, the A400M transport aircraft and of the Tiger and NH90 helicopters. The company furthermore contributes to the Puma's sensor system via the weapon optronics sensors, the periscope and the driver's sights, which enable the crew to fulfil their missions even under conditions of poor visibility.

PUMA: SETTING NEW STANDARDS

PUMA's inherent protection affords its crew protection against mines, shaped charges and KE ammunition as well as NBC weapons. To support this capability, it features protection technologies of the latest generation. Its air portability combined with excellent agility in heavy terrain and its scalability for future requirements defines that system as an ideal companion for international conflict management. In terms of strategic and tactical mobility, the IFV PUMA exceeds all requirements of enforcement capability and combat power.

Puma's leadership capacity in networked operations is also available under extreme climate conditions and insufficient infrastructure. This is made through the provision of interfaces for the command and control system (FüInfoSys), the targeting friend and foe (FFI), and the Future Soldier System (Infanterist der Zukunft).

KMW develops and manufactures the Infantry Fighting Vehicle PUMA together with Rheinmetall Land Systems. This joint venture is called PSM Projekt System & Management GmbH and is based in Kassel.

Fire power

Maximum fire power is a prerequisite for successful engagement in high-intensity conflicts and for adequate reactions in other missions with the option of escalation and de-escalation. The Puma achieves this fire power through the interaction of different innovative elements.

The main armament is the fully stabilised, automatic 30 mm MK30-2 ABM fitted to the remote-controlled turret. This weapon designed for target engagement on great distances also on the move. 200 rounds of two types of ammunition are available ready to use. Further 200 rounds are stowed in the chassis. In addition to existing 30 mm full-calibre and sub-calibre fin-stabilised ammunition, it is also possible to fire the newly developed air burst ammunition with time fuzes. A variety of state-of-the-art optical and optronic vision devices enables the whole crew 360° all-around surveillance, recognition and identification of targets on long distances. The hunter-killer functionality, as available in the Leopard 2 main battle tank, allows the rapid engagement of several targets within a very short time. PUMA receives an additional weapon system with the integration of the Anti Armour/Multi-Purpose Missile System SPIKE, provided by EuroSpike. The integration of SPIKE boosts the PUMA's lethality significantly. Due to the existing interfaces a grenade launcher can be mounted optionally.

The coaxial mounted MG 4 is used as a secondary armament laid and operated analogue to the main weapon. The integration of Missile Weapon System SPIKE allows the PUMA to fight enemy targets as well as helicopters and threats behind enemy lines even more effectively. The launcher for the two missiles (SPIKE LR) with multipurpose high lethality war heads will be mounted on the turret. Min. Range is 200m with a Max. Range 4000m.

Ammunition

The envisioned 30 mm APFSDS-T is a sub-calibre fin-stabilised ammunition with high penetration capability. It is mainly used against vehicles of medium armour protection.

The envisioned 30 mm KETF is a full-calibre multi-purpose ammunition. Depending on the type of target, its time fuze is set for a defined time of flight. Depending on the fuze setting, sub-projectiles will be ejected. Due to the cone of fragments an optimum effect against the specific types of targets will be achieved.

MK30-2/ABM

Calibre: 30 mm
Rate of fire: 200 rounds per minute
Effective range up to 3000 m
Envisioned standard ammunition: APFSDS-T and KETF (other types of ammunition possible)
* Alternate firing of different types of ammunition without last shot accomplished by dual ammunition feeding
* Muzzle velocity measurement and fuze setting of air burst ammunition (ABM)
Ammunition: 200 rounds ready to fire, additional 200 rounds in storage

Preparing for GDPR to Improve Personal Data Protection

The General Data Protection Regulation (GDPR) looms just over the horizon. The General Data Protection Regulation (GDPR) (Regulation (EU) 2016/679) is a regulation by which the European Parliament, the Council of the European Union and the European Commission intend to strengthen and unify data protection for all individuals within the European Union (EU). The countdown is on for GDPR compliance by May 2018. Intended to improve personal data protections and increase accountability for data breaches, it is perhaps the most comprehensive data privacy standard to date.

The regulation presents a significant challenge for organisations that process the personal data of EU citizens, regardless of where the organisation is headquartered and even for organisations handling personal data of any national since the company is based on the EU territory.

Some of the concerns regarding GDPR include: Understanding the risks to the systems where personal data is processed, preparing to respond to a breach in accordance with Articles 33 and 34 and responding to a data subject's request to 'be forgotten'. Reportedly, less than a third of companies (31 per cent) are prepared for the GDPR.

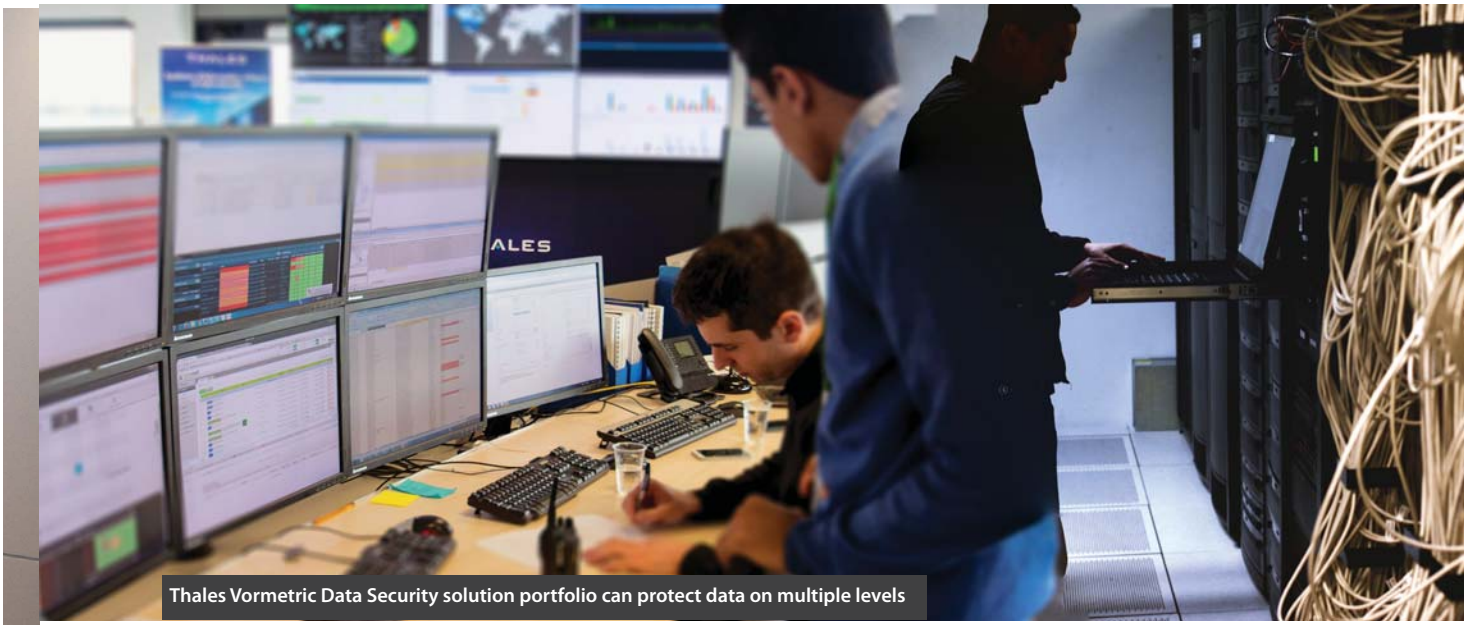
The key requirements in implementing GDPR includes policy documentation on personal data protection, incident response/breach notification response plan, legal documents giving evidence of the conformity with GDPR and implementation of security measures.

Specialised tools

Thales, a major European leader in cyber security with long-term data protection expertise, could be a one-stop-shop to achieve and maintain GDPR compliance.

The company can help in assessing current GDPR maturity. Their experts can analyse processes and with the help of specialised tools they can create a data map, where personal data is stored, processed, and how it is flowing between information systems.

Thales is also partnering with legal firms across Europe to assure a full coverage of all requirements. Individual GDPR compliance plan will contain a prioritised action list for roles and responsibilities, processes, awareness actions, a data protection policy and suggestions on how to integrate GDPR requirements into your existing information system.



Thales Vormetric Data Security solution portfolio can protect data on multiple levels

Preventing personal data leakage is a major concern of GDPR and with Thales Vormetric Data Security solution portfolio, data can be protected on multiple levels through encryption, and also assure visibility of unauthorised access to personal data.

Vormetric Data Security Platform

The Vormetric Data Security Platform makes it easy and efficient to manage data-at-rest security across entire organisations. Built on an extensible infrastructure, the platform features multiple data security products that can be deployed individually or in combination to deliver advanced encryption, tokenisation and centralized key management. This data security solution prepares organisations for the next security challenge and new compliance requirement at the lowest TCO.

Vormetric tokenization

Vormetric Vaultless Tokenisation with Dynamic Data Masking dramatically reduces the cost and effort required to comply with security policies and regulatory mandates like PCI DSS. The solution delivers capabilities for database tokenisation and dynamic display security. It allows companies to efficiently address objectives for securing and anonymising sensitive assets—whether they reside in data centre, big data, and container or cloud environments.

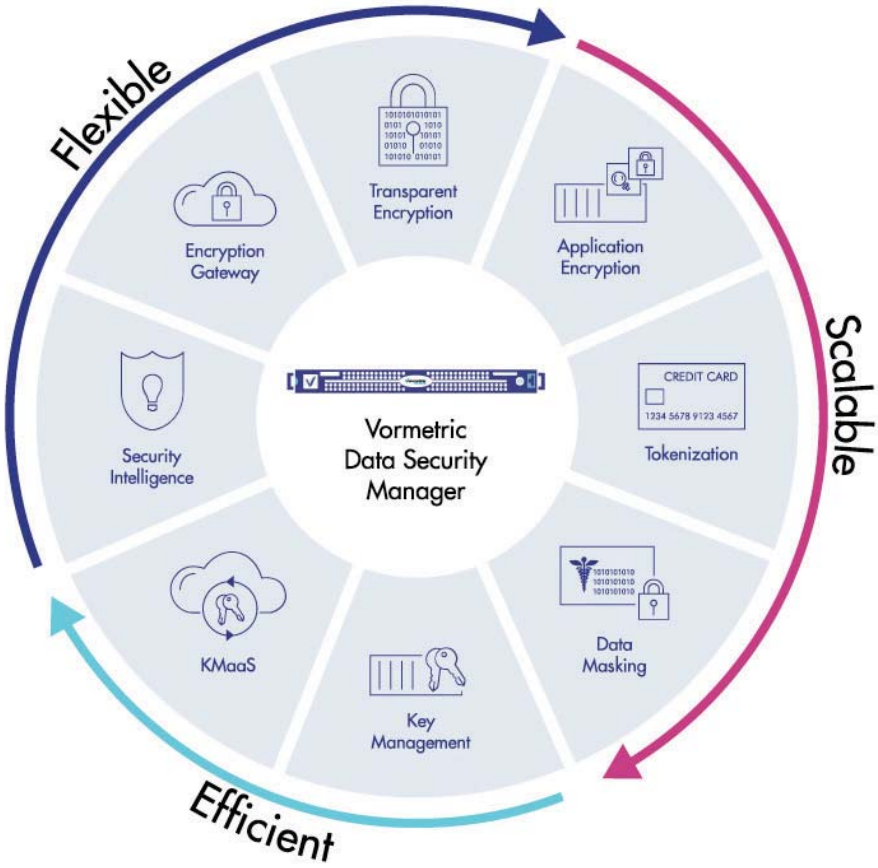
Administrators can establish policies to return an entire field tokenised or dynamically mask parts of a field. For example, a security team could establish policies so that a user with customer service representative credentials would only receive a credit card number with the last four digits visible, while a customer service supervisor could access the full credit card number in the clear.

With the solution's format-preserving tokenisation capabilities, you can restrict access to sensitive assets without changing the existing database schema. The solution's REST API implementation makes it fast, simple, and efficient for application developers to institute sophisticated tokenisation capabilities.

Cloud encryption gateway

The Vormetric Cloud Encryption Gateway encrypts files before they are saved to cloud storage environments. Security teams gain visibility and control required for sensitive assets used in the cloud. The Vormetric Data Security Manager provides encryption key and policy management for the Cloud Encryption Gateway. The Vormetric Data Security Manager (DSM) provisions and manages keys for the Vormetric Data Security Platform and manages keys and certificates for third-party devices. With this comprehensive cloud security gateway solution, users retain encryption key control and data never leaves the premises unencrypted or unaccounted for. Security teams manage encryption keys and policies on their premises, retaining localised visibility and control.

The Cloud Encryption Gateway provides detailed visibility into data access and features dashboards that offer intuitive insights into usage of



cloud storage applications. Through its virtualised appliance architecture, the Vormetric Cloud Encryption Gateway offers elastic scaling that enables IT teams to efficiently accommodate changing performance and scalability demands.

Achieving compliance

Thales IT experts can guide users to implement the required functionality to comply with individuals' rights, such as "right of information", "right to be forgotten" or "limitation of processing". Solutions developed by Thales implement the key principles of "Cybersecured by Design" and "Privacy by Design".

Once initial GDPR compliance has been achieved, a full set of solutions and services help users to remain compliant. Thales data protection products and agents detect and alert suspicious activities and allow users to intercept before a data leakage attempt can create damage.

All this information can be consolidated and managed in real time by CSOC (Cyber-security Operation Center). Through HySIO (Hybrid and secured IT Outsourcing) offer Thales can help users to be GDPR compliant data processor across all types of infrastructures from local data centres to public clouds. With regular audits, intrusion testing and consulting, Thales customers will remain GDPR compliant at any time.

Thales also announced recently that the Internet-based financial services technology company Beyond Platform has adopted Vormetric Transparent Encryption from Thales to deliver a secure credit evaluation model for its peer-to-peer (P2P) lending platform.

Beyond Platform wanted to implement a data security system that offered a security level required by the major banks in order to comply with the Personal Information Protection Act (PIPA) in South Korea. In addition, the solution needed to pass a security review by NongHyup Bank (an agricultural and retail bank in South Korea) with whom Beyond Platform was developing a joint P2P lending service. Beyond Platform adopted Vormetric Transparent Encryption from Thales to encrypt structured and unstructured data in an enterprise system. As a result, it met the database encryption requirements and passed the bank security review, opening the floodgate for developing and launching P2P services. In addition, the company has built a reputation among customers as a reliable and safe P2P provider.

For a startup like Beyond Platform, with a limited number of data security personnel, the solution was considered suitable because it has few performance issues once deployed and offers ease of maintenance. The elimination of additional maintenance and labor costs related to implementing the new solution drastically reduces the total cost of ownership (TCO). The decision to adopt Vormetric Transparent Encryption was also largely influenced by the fact that the full implementation of encryption technology could be reached without making any changes to the existing systems, and the implementation time was significantly shorter than that of other companies.

Embraer delivers first Phenom 100 to the UK

RAF Phenom

Embraer recently delivered the first Phenom 100 business jet to Affinity Flight Training Services. The aircraft has been selected to provide Multi-Engine Pilot Training to the UK Armed Forces as part of the United Kingdom Ministry of Defence's Military Flying Training System (UKMFTS) programme. The contract with Affinity comprises a firm order for five Phenom 100s and services support, as well as an option for additional follow on aircraft.

"The departure of the first Embraer Phenom 100 from Brazil, en route to the UK, marks a significant milestone in preparation for delivering the MFTS Fixed Wing programme," said Iain Chalmers, Managing Director of Affinity. "Affinity is delighted this has been achieved ahead of the original programme schedule, and look forward to seeing the aircraft at RIAT 2017."

The Fixed Wing programme is intended to replace the Elementary, Multi-Engine and Basic Flying Training that is currently delivered on aging platforms with a new, fully integrated solution that provides state-of-the-art training aircraft, ground based training devices and courseware all derived from the training design developed by Ascent Flight Training, the training service provider of the UKMFTS programme. In 2014, Affinity was selected by Ascent Flight Training to provide and maintain the aircraft selected for the UKMFTS programme.

"We are very happy with our partnership with Affinity and for the opportunity to take part in the UKMFTS programme," said Jackson Schneider, President and CEO of Embraer Defense & Security. "The Phenom 100 delivers a sound combination of top performance, reliability, low operating costs and high availability. There is no doubt that the advanced technology of the Phenom 100 makes it the right solution for the Multi Engine Pilot Training of the UK Armed Forces, and will reduce costs whilst ensuring the proficiency of flight crews."

The Phenom 100 has the capacity for four passengers in its normal configuration, but it can carry up to seven passengers with a single crew, with an optional side-facing seat. The aircraft is fitted with two rear-mounted Pratt & Whitney Canada PW617-F turbofan engines. The engines have dual full authority digital engine control (FADEC).

The UKMFTS takes UK armed forces aircrew from initial training through Elementary, Basic and Advanced flying training phases preparing them for their arrival at their designated Operational Conversion Units. Ascent Flight Training, a consortium of Lockheed Martin and Babcock International under a 25-year Private Finance Initiative (PFI) contract for the UK's Ministry of Defence (MoD), operates it. Apart from the overall contract, the main elements of the system include fixed-wing elementary, basic, multi-engine and fast-jet pilot training, rear crew training and rotary-wing (helicopter) training.

Drones Deliver Sea, Surface and Sky Supremacy

New developments in drone technology have significantly increased their reliability, autonomy and overall versatility in the past few years.

Naval Group (DCNS changed its name to Naval Group recently) views naval drones as an extension to its range of naval vessels, as they provide an added degree of versatility to operations. Traditional surveillance means relying on satellite and/or long-range unmanned aircraft to return information and data. But drones are more reliable, efficient, responsive, discrete and less expensive to mobilise, and do not rely on optimal meteorological conditions to get the job done.

With three types of drones particularly applicable in the field of naval operations – aerial, surface and submarine drones – they represent the perfect solution for enhancing efficient remote surveillance and interaction capabilities, while limiting both exposure and cost.

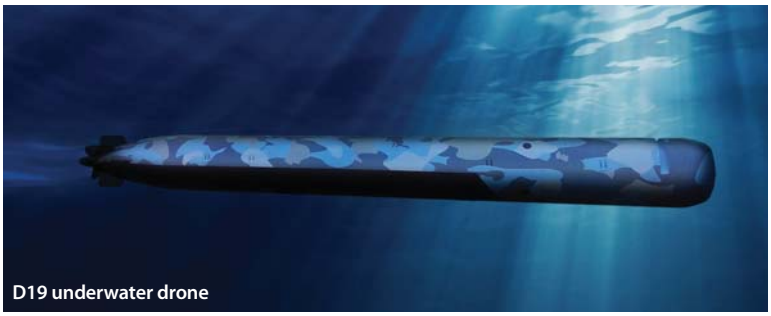
With such numerous, clear-cut advantages, Naval Group has positioned itself at the forefront of naval drone technology, and has gone one step further in developing a fully-integrated mission system designed to co-ordinate drone missions all from one interface, the I4 ®Drones.

Co-ordinating remote operations

The company has recently demonstrated the interoperability of its I4®Drones mission system, by orchestrating a large-scale simulation in the south of France. The simulation showcased co-ordination of an aerial, surface and submarine drone, in a smooth, seamless operation.

I4 Drones allows for planning, management and real-time operation of drones and their payloads, and for their successful re-instatement.

Such successful simulations not only demonstrate Naval Group's industrial engineering and innovation capabili-



D19 underwater drone

ties in the field of military drones, but also position it as a leading systems provider for drone mission systems amongst foreign navies.

Teaming up across the board

I4®Drones enables an A-Z approach to drone mission management. It covers three key stages of any mission: preparation, implementation and data processing, and return and reinstatement, while allowing for drone supervision throughout the operation and in every environment; aerial, surface and submarine.

It can be deployed on-board a submarine, a ship or from a maritime control centre, giving navies the possibility to conduct any operation from any platform.

Ultimately, I4®Drones facilitates and enhances efficacy and interoperability between vessels and drones in the context of inter-armed or inter-allied coalitions, giving them an undeniable edge.

Naval Group's latest outfield players

Naval Group and its partners and subsidiaries, have developed a team of complementary aerial, surface and submarine drones capable of operating in unison in a mission environment.

In the context of its naval innovation days, Naval Group has achieved coordinated deployment of three types of drones, underwater, airborne and surface.

This is the first time in Europe a company has organised and implemented such a successful end-to-end performance. During this demonstration, it was possible to detect a suspect vessel, which was identified and neutralised in less than twenty minutes.

In partnership with SMEs/SMIs, the company conducted a large-scale sea demonstration with three drones: its own D19 underwater drone, the REMORINA surface drone, produced by its subsidiary Sirehna, and the IT180 mini-UAV from ECA Group. These three drones were deployed off the south of France.

> I4®Drones facilitates and enhances efficacy and interoperability between vessels and drones

Through deployment from a land-based centre, the drones detected, identified and neutralised a vessel representing a threat.

I4®Drones is the product of several years of R&D and innovation, and the fruit of the group's recognised expertise in system development, in particular for the naval integration of drones.

D19 - More agility and safety underwater

Naval Group coordinated the D19, an underwater drone, for the detection phase; the IT180 UAV, a rotary-wing drone, for the identification phase, and REMORINA, a naval drone, for the final step of interception and neutralisation. Planning, management and real-time operation of the drones and payloads, and mission restitution were conducted via I4 Drones. The system transmitted the mission's real-time progress onto an image wall.

Drawing on its extensive know-how in the field of torpedoes and mobile underwater targets, the D19 is Naval Group's first-ever autonomous military submarine drone, designed to enhance operational reach and versatility of both surface vessels and submarines.

At a time when the vast majority of underwater surveillance operations take place in low-depth coastline waters, submarine drones like the D19 offer a safer, more agile alternative for acquiring data in such previously inaccessible locations.

In parallel to the D19, Naval Group has developed several homing and docking solutions for UUVs launched from a submarine. The most recent docking station is capable of recharging the drone using induction, secure wireless data transfer, an acoustic data link for guidance, and a redeployment system. Sea trials of the station began in October 2016.


REMORINA Surface drone


UAV IT180 rotary-wing mini-UAV

The UAV IT180 rotary-wing mini-UAV developed by ECA Group is easy to use, even under difficult weather conditions

Developed by DCNS and CLARTE, a French virtual reality research enterprise, using information gathered through close collaboration with the French Navy, Heads Up Display for Pilots (HEUDYP) is a system designed to assist drone operators during take-off and landing of ship-borne drones.

Using augmented reality, HEUDYP provides the pilot with more than just visuals. It provides information regarding atmospheric conditions and the ship's movement, to assist with launch and recovery from the ship's deck.

REMORINA - Enhancing tactical information

REMORINA is a surface drone developed by Sirehna. Endowed with decision-making autonomy and advanced obstacle-avoidance functions, it can approach an object autonomously, or by remote control, and interact with a threat. Equipped with multiple sensors, it transmits its data to the land-based centre in real time, providing enhanced tactical information. It can actuate its non-lethal weapons or conduct manoeuvres to deny access to a zone.

UAV IT180 - Advanced monitoring and security

The UAV IT180 rotary-wing mini-UAV developed by ECA Group is easy to use, even under difficult weather conditions.

Its flexible battery system provides autonomy of two hours, an operating range in excess of 30 nautical miles and a payload of up to 5kg (IR, video, PIR).

This UAV can be used to monitor and secure the area around a vessel, detect floating drifting mines in front of a transiting expeditionary naval force or be linked by fibre optic to its "mother vessel" as a trans-horizon radio relay for the UAVs and naval surface drones intervening in a mine-threat area.

The IT 180 UAV is a compact VTOL aircraft. An initial implementation of the "navalisation" concept took place at Naval Group's Naval Innovation Day in Ollioules, and the IT180 took part in an interception scenario in Toulon harbour.

Equipped with a gyro-stabilised dual sensor (EO/IR) camera, it brings accurate situation awareness. All data collected are displayed in real time and geo-referenced on the Ground Control Station (GCS) screen, from which the UAV IT180 can be operated.

Used by the French Army since 2012, which has qualified all Detection, Recognition and Identification (DRI) capabilities, its low radiated noise and radar cross section allow it to perform covert operations, such as ISTAR.

Combat proven, the UAV IT180 is reliable, even in harsh weather conditions. The drone can be used to detect floating drifting mines in front of an expeditionary naval force in transit. Connected by umbilical to the mother ship, it can be used as a trans-horizon radio relay with other aerial drones and naval surface drones implemented by the same ship.

Reference Photo/Text:
www.naval-group.com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Defence Against Drones


GUARDION HPEM Effector


GUARDION mobile system setup

In recent times, drones have become notorious and pose a serious security risk at major public events and also to high-risk infrastructures and facilities such as airports, industrial test sites, large plants, military sites and correctional facilities, especially in light of the fact that sales are booming and anyone can use them.

With this in mind, ESG Elektroniksystem und Logistik-GmbH, Diehl Defence and Rohde & Schwarz recently signed a cooperative agreement in the area of drone defence. Building on experience gained through their successful cooperation during both the 2015 G7 Summit in Elmau and the U.S. presidential trip to Hanover in 2016, the companies want to coordinate their efforts even more closely and provide fully customised, bundled solutions based on their proven expertise in the fields of radar, radio monitoring, electromagnetic countermeasures, command and control information systems and position mapping.

The GUARDION drone defence system combines the scalable solutions customised to very specific customer requirements to reliably detect and defend against threats posed by the unauthorised use of drones. GUARDION is offered as an integrated product. It has a proven track record of reliable protection in various applications. It focuses on integrating electronic detection, verification and countermeasures and connecting them to a position mapping and command and control tool. The HPEMcounterUAS effectors from Diehl Defence, R&S ARDRONIS from Rohde & Schwarz and the TARANIS command and control and position mapping system developed by ESG have proven their capabilities in operational use.

The trend toward increasingly intelligent drones also requires an effector that civil forces can use against autonomously flown systems, i.e. systems that are not dependent on radio signals or GPS for navigation. A significant countermeasure component in GUARDION is therefore the HPEMcounterUAS from Diehl. "Today, reliable protection against small airborne vehicles must function against both radio-controlled and autonomously flown objects," says Helmut Rauch, Managing Director at Diehl Defence.

Guardion Sensors

RADAR: GUARDION integrates 360° radar solutions which enable early detection of potential drone threats due to their long-range capabilities. Automatic classification furthermore supports unambiguous differentiation between drones and false targets as well as simultaneous detection of multiple targets.

RF ANALYSIS/ DIRECTION FINDER: R&S ARDRONIS focuses on the remote control radio link of commercial drones. The subsystem can detect and identify the drone and take bearings on the remote controller even before the drones take off. Its ability to distinguish the remote control signals from other emissions within the same frequency band makes it highly reliable. R&S ARDRONIS alerts security personnel early on so they can respond to the potential threat in a timely manner.

ACOUSTIC: With an additional acoustic array component, GUARDION enables operators to continuously analyse the sound spectrum, and thus detect and

identify incoming drones via their specific acoustic signals. Acoustic arrays are hereby highly reliable both for small-scale scenarios as well as for supporting missions in complex large-scale premises.

OPTIC: For the visual verification and tracking of identified objects, the GUARDION solution uses optical systems, which can optionally cover the full spectrum of day and night vision with efficient PTZ and IR cameras, depending on individual requirements.

EFFECTORS: The great variety of control mechanisms of drones requires a comprehensive multi-level countermeasure approach. GUARDION offers an appropriate portfolio of countermeasures with minimal effect on uninvolved third parties, reaching from organisational action, over technical jamming of radio signals (R&S ARDRONIS), GNSS signals, or WIFI Disconnect up to deactivation, where as a last resort, Diehl's HPEMcounterUAS directs high-power electromagnetic pulses toward the drone, causing the control unit to malfunction.

R&S WIFI Disconnect enables the detection and targeted disruption of the exact WIFI signal used to operate an incoming drone without affecting uninvolved third parties. R&S®ARDRONIS can also disrupt the drones' remote control radio links. It exactly matches the transmissions on the remote control signal and does not interfere with other radio links. No longer controllable by their pilots, the drones are forced into failsafe mode.

The GUARDION GNSS Jammer can disrupt the GNSS (global navigation satellite system) signal used by drones navigated in waypoint mode. Via directional antennas, GUARDION ensures the targeted disruption of a predetermined sector to minimize third-party effects.

GUARDION mobile control stand

Diehl HPEMcounter UAS

The Diehl HPEM counter UAS source directly impacts the semiconductors of the control electronics inside commercial drones by means of electromagnetic pulses. Whether flying autonomously or radio-controlled, the drone becomes inoperable upon impact of HPEM pulses.

If navigation methods like inertial navigation, infrared homing, optical flow, home on jam, simultaneous localisation and mapping are used, jammers cannot affect the drone. In such cases, the HPEM can affect the control electronics, regardless of the control method, and immediately disable the drone.

Command & Control

ESG's state-of-the-art command and control system TARANIS connects all subsystems, sensors and effectors and facilitates their interaction and coordination, even in a dispersed or remote setup. The links can be established via LAN, LTE or other radio services. The C2 system enables crisis centres and mobile mission forces to assess, share and communicate this information securely and in real-time.

TARANIS fuses and analyses all incoming sensor data, visualises the incoming drone, the threat location and movement track of both the drone pilot as well as own assets and security personnel in real-time. All relevant additional geo-information from the scenario (grid reference, etc.) can be integrated and fed into the C2 system.

Situational awareness: The solution displays all information on a map, creating a comprehensive situational picture, so the overall system can be monitored and controlled by a single operator. With this improved situational awareness, ESG's TARANIS enhances operators' capacities to launch and coordinate appropriate countermeasures ranging from organizational action to technical jamming to deactivation.

Preservation of Evidence

GUARDION supports preservation of evidence by logging all sensor data and user interactions. These can be used, for example, to reliably identify the operated drone and remote control.

Reference Photo/Text:
www.diehl.com

Future Fighters Can See Brighter

Tactical aircraft are now functioning as fighters and bombers, and providing a host of other capabilities too. These include intelligence, surveillance and reconnaissance, close-air support, electronic warfare and communications capabilities, for example. Multi-mission is the name of the game, and it calls for a new era of sensor flexibility.

"We live in an era of rapid change, where software and electronics are expected to perform multiple functions," says Rob Fleming, vice president of programs at Northrop Grumman. "Every smartphone user understands the benefits of multi-mission systems. We have applied that same thinking to OpenPod."

OpenPod is a multi-mission, reconfigurable, open architecture pod system. In minutes, maintainers can have an aircraft ready for a new mission.

OpenPod will be available with Infrared search and track (IRST) and targeting packages at launch, followed by communications, LIDAR, 5th-to-4th generation communications, and other future options.

Because the pod allows for sensor changes without modifications to the aircraft or mission computer, OpenPod can always be upgraded independently of the aircraft. This allows for more rapid, affordable upgrades and new technology integration.

Making sensor pods mission ready in minutes

Until now, maintaining readiness for multiple missions required difficult compromises and a mix of single-mission systems. Reconfiguring an aircraft for a new mission set was no simple matter – and not something that could be done easily in the field.

With OpenPod, maintainers can reconfigure a sensor pod to suit mission requirements - something that was not possible before. It takes just minutes and uses existing LITENING Advanced Targeting Pod tools and procedures.

Reconfiguring OpenPod is as simple as swapping line replaceable units and attaching a new front end. In minutes, maintainers can have an aircraft ready for a new mission. An air-to-air mission to clear the skies may call for infrared search-and-track, while a subsequent air-to-ground mission may require a suite of advanced targeting sensors. With OpenPod, the aircraft may be ready for its next mission even before the crew can finish another energy drink.

Tracking an aircraft in flight with a passive sensor is no easy task. Tracking an aircraft beyond the line of sight seems nearly impossible. Distance, supersonic

speed, clutter and environmental factors all increase the level of difficulty. But OpenPod makes it happen.

OpenPod IRST begins with an understanding of what happens when an object travels through the air. Every object creates friction as it pushes against the air.

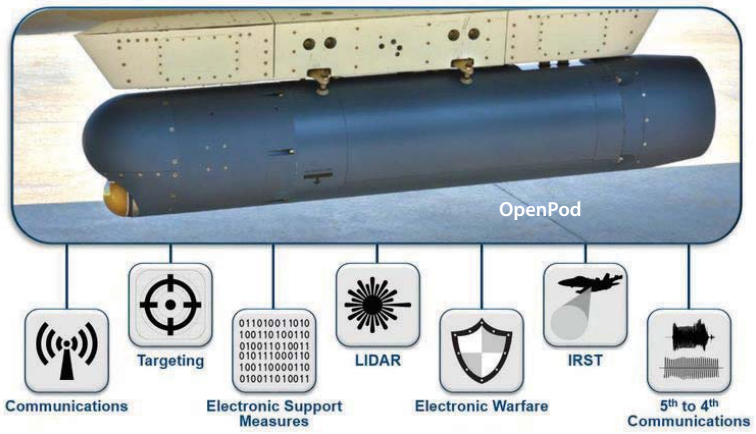
That friction leads to heat, which registers on the electromagnetic spectrum as infrared light. An infrared sensor is able to detect this energy. OpenPod IRST uses an advanced focal plane array to perform this task.

Next, complex algorithms take over, and separate the hot aircraft from the cooler background. This allows the system to track the aircraft against the sky, ground and other objects, often referred to as clutter.

This is where Northrop Grumman's decades of experience with infrared countermeasures, the LITENING targeting system and the F-35 Distributed Aperture System really stand out.

Proprietary software allows these systems to track fast-moving targets with great precision, and to share tracking data with other systems.

OpenPod IRST generates weapons-quality tracking data. The pod can share that data over Link 16 and other protocols with a fire control radar or other systems for engagement.



A sharper eye in the sky

Detecting an opponent without being detected has always been an important tenet of air warfare. OpenPod increases the odds of that happening.

To track fast-moving targets - even beyond line of sight - takes a state-of-the-art sensor and sophisticated algorithms based on decades of experience. This combination gives warfighters a sharper eye in the sky, and protection against modern airborne threats.

OpenPod has a powerful infrared sensor, currently in service around the world. It allows pilots to see targets beyond the line of sight, day or night. And it does so without emitting detectable energy.

But what really sets OpenPod IRST apart isn't just its sharp vision, but also its ability to turn images into useful information.

Fire control advantage

Pilots can do more than simply detect targets of interest. They can track targets in three dimensions with great precision, identify them and take appropriate action. OpenPod is able to provide weapons-quality data to onboard systems, or to other aircraft for additional response.

Decades of EO/IR algorithm development, fire control radar experience gained from the 5th-generation F-22 and F-35 fighters, and an advanced sensor add up to a new level of situational awareness and airborne superiority for aviators.

It's a combination that makes any warfighter more formidable.


OpenPod on aircraft front

Reference Text/Photo:
www.northropgrumman.com

Bright future for F/A-18 Super Hornet

The US Navy is struggling to make up a shortfall in its strike fighter inventory, so the future looks bright for Boeing's F/A-18E/F Super Hornet.

The Super Hornet could serve in the fleet until at least 2035, with the Navy requesting funding for an advanced Block III version in the 2018 budget. The Navy needs enough aircraft to fill out its air wings—particularly if the size of the fleet is increased. That is why ten Super Hornets were added to the top of the FY18 unfunded priorities list.

Boeing is planning to build two F/A-18s per month — slower than it has historically — but the Navy is also purchasing fewer jets per year than during the programme's heyday in the 2000s. But given the projected Navy buy, a total of 80 new Super Hornets should keep the production line open into the mid-2020s.

Giving Hornets a helping hand

Boeing sees the need for more foreign and domestic F/A-18s, which could drive production back up. If US President Trump's defense expansion plans succeed, the Navy might need even more aircraft.

Meanwhile, Boeing is working with the Navy to extend the life of existing Super Hornets with the Service Life Modification Program (SLM).

New Super Hornets coming off the production line in fiscal year 2019 could be built in an advanced Block III configuration.

Boeing can also take the Block III capabilities and retrofit them into existing Block IIs, under the SLM Program. With those two programmes, new production and SLM, Boeing can build the fleet of Block IIIs quickly.

An advanced Super Hornet is no longer a notional project. It will become reality if current plans hold.

Unlike Boeing's previous Advanced Super Hornet concept that debuted in 2013, the new Block III aircraft is a more unpretentious proposition, designed to support the rest of the air wing including Lockheed Martin's F-35C Joint Strike Fighter, Northrop Grumman's E-2D Advanced Hawkeye and the EA-18G Growler under the Naval Integrated Fire Control Counter Air construct (NIFC-CA).

The Block III takes the existing upgrade path for the Super Hornet—including biennial hardware and software upgrades—and expands them. Existing planned upgrades to the jet's powerful Raytheon AN/APG-79 active electronically scanned array radar, AN/ALQ-214 Integrated Defensive Electronic Countermeasures Block IV suite, and the Lockheed Martin AN/ASG-34 Infrared Search and Track pod are part of the Block III package.

See first, strike first

The aircraft's infrared search and track (IRST) system is developed and inte-


IRST is expected to deploy on the F/A-18 Super Hornet this year

grated by Boeing and Lockheed Martin. The system comprises Lockheed Martin's IRST21 sensor, a GE Aviation FPU-13 fuel tank assembly and Meggitt Defense Industry's environmental control unit. The system demonstrated production readiness through extensive assessments, including flight tests.

"This 'see first, strike first' capability can be used in a variety of threat environments and is a game changer for our warfighters as we combat future adversaries," said the US Navy F/A-18 program manager. IRST is expected to deploy on the F/A-18 Super Hornet this year.

The long-range IRST21 sensor is the next generation of Lockheed Martin's legacy IRST sensor system, which accumulated more than 300,000 flight hours on the U.S. Navy's F-14 and international F-15 platforms.

IRST enhances multiple target resolution compared to radar, providing greater discrimination of threat formations at longer ranges. Data is fused with other on-board F/A-18 sensor data to provide maximum situational awareness to the warfighter.

> The aircraft's infrared search and track (IRST) system comprises of IRST21 sensor, FPU-13 fuel tank assembly and environmental control unit

Fantastic five

Boeing and the Navy plan to add five new features to round out the overall Block III package.

Conformal fuel tanks can extend the range by 120 nautical miles. The Block III aircraft will be produced with a 9000-hour life airframe. There will also be improvements to its low observables technology.

The Block III will also have a powerful new computer, a Distributed Targeting Processor-Networked (DTP-N) and powerful high-band connectivity with the Tactical Targeting Network Technology (TTNT) Internet protocol-based datalink. A new cockpit system features a 10-by-19 inch display and new crew interfaces.

Intelligent missile manouvres

Lockheed Martin's Long Range Anti-Ship Missile (LRASM) was successfully released from a U.S. Navy F/A-18E/F Super Hornet in April this year. The weapon is a collaborative effort between Lockheed, the Office of Naval Research and the Defense Advanced Project Research Agency (DARPA).

The jettison release of the first LRASM from the Super Hornet is used to validate the aerodynamic separation models of the missile. This successful test event paves the way for flight clearance to conduct captive carry integration testing.

"This is a major milestone towards meeting early operational capability in 2019," said Mike Fleming, Lockheed Martin LRASM program,e director. "The program is executing the integration and test contract, maturing subsystems and proving flight worthiness."

LRASM is designed to detect and destroy specific targets within groups of ships by employing advanced technologies that reduce dependence on intelligence, surveillance and reconnaissance platforms, network links and GPS navigation. The missile employs a multi-modal sensor suite, weapon data link, and enhanced digital anti-jam Global Positioning System to detect and destroy specific targets within a group of numerous ships at sea.

Once operational, LRASM will play a significant role in ensuring military access to operate in open ocean/blue waters, owing to its enhanced ability to discriminate and conduct tactical engagements from extended ranges.

Hornet history

The McDonnell Douglas F/A-18 Hornet was designed for aircraft carrier duty and was the first tactical aircraft designed to carry out both air-to-air and air-to-ground missions. The US Marines ordered it as an F-18 fighter, and the Navy as an A-18 attack aircraft. It can switch roles easily, and can be adapted for photo-reconnaissance and electronic countermeasure missions.

This was the first aircraft to have carbon fibre wings, and to use digital fly-by-wire flight controls. Variants included a two-seater, an improved fighter, a reconnaissance aircraft and a night-attack fighter.

Hornets entered active duty in January 1983. During the 1991 Persian Gulf War, while performing an air-to-ground mission, Hornets switched to fighter mode and destroyed two Iraqi MiG-21s in air-to-air combat, then switched back to attack mode and successfully completed their air-to-ground mission. During 2001, Hornets provided around-the-clock battlefield coverage in Afghanistan.

The F/A-18E/F Super Hornet made its first flight in November 1995. It is a low-observable aircraft that performs multiple missions, including air superiority, day-and-night strike with precision-guided weapons, fighter escort, and close air support. The Super Hornet is produced in the single-seat E model and the two-seat F model. It is 25 percent larger than the original Hornet and has increased maneuverability, range, payload and more powerful engines. It entered operational service with the U.S. Navy in 1999, after Boeing merged with McDonnell Douglas, won the Collier Trophy for that year, and flew its first combat missions in 2002.

In April 2005, Boeing delivered the first Block II Super Hornet, an upgraded Super Hornet with the world's first tactical multimode active electronically scanned array (AESA) radar.

In 2010, the Super Hornet took a flight test using a 50/50 biofuel/aviation fuel mix. Dubbed the Green Hornet, the F/A Super Hornet has won seven consecutive awards for environmental excellence from the U.S. Navy.

Boeing will upgrade additional F/A-18 Hornet and Super Hornet fighters for the Navy and Marine Corps through a recently awarded $238 million contract extension.

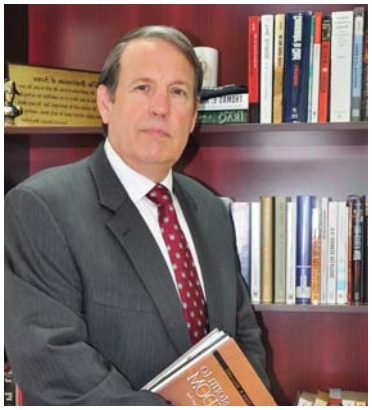
Boeing's suite of upgrades (conformal fuel tanks, enclosed weapons pod, enhanced engine and reduced radar signature) along with other advanced technologies, offer customers a menu of next-generation capabilities to cost effectively outpace future threats.

Hornet maintenance

Reference Photo/Text:
www.boeing.com
www. nationalinterest.org

Strategic Perspectives

"Strategic Requirements: Balancing Short Term Desires with Enduring Interests"



By: Dr. John R.Ballard
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Every national strategy requires adaptability and an understanding of regional dynamics to succeed. The ongoing crisis with Qatar shows the adaptability required to maintain effective alliances over the long term. But today, our region stands at a strategic crossroads; balancing short term desires against enduring strategic interests must be a clear choice. In the current case, the consequences if Qatar does not comply with the nine-nation effort aimed at stopping its support of terrorism are far reaching and odious.

The nine nations pressuring Qatar are no longer insisting on 13 specific demands; instead they have now focused only on Qatar's acceptance of six broad principles, built upon combating terrorism and extremism, denying financing and safe havens to terrorist groups, stopping incitement to hatred, and violence and refraining from interfering in the internal affairs of other countries – all of which are reasonable expectations of any nation. The Nine have provided a minimum requirement; Qatar risks regional stability and its future prosperity if it fails to agree.

Seven other Arab nations support Saudi Arabia and the UAE – thus the Arab world stands firmly against Qatar. The United Kingdom's foreign secretary stated that Qatar needs to do more to stop the funding of extremist groups. The United States has tried to moderate the crisis, attempting to find a middle ground; Canada also called for de-escalation but expressed concern for Qatar's funding of terrorism. The French called for a "de-escalation" and seek moderation of the crisis. Only Germany's foreign minister expressed support for Qatar among Europeans and criticized the severing of ties. Thus, Europe and North America advise Qatar to accept the six principals.

Iran has sent planes filled with fruit and vegetables and promised to continue the supply. Turkey
has also pledged food and water supplies along with a small troop deployment to a new Turkish military base in Qatar. President Erdogan has even termed the isolation of Qatar "inhumane and against Islamic values." Russia has also called for an end to the current crisis, generally supporting Qatar. The economic impacts are already clear: Qatar's debt has been downgraded from AA to AA-; Qatar's stock market has dropped nearly ten percent. Qatar has resorted to expensive imports from Iran and Oman to circumvent the boycott and some economic experts feel that Qatar could eventually pay "an incommensurate price" for defying its GCC partners. Qatar does not have the infrastructure required to withstand the costs of resistance for a prolonged period. Sadly, Iranian, Turkish and Russian support in the region pose only additional problems. Should Qatar refuse the broad principles and continue support from such countries, regional stability, the foundation of Qatari prosperity, would be fractured.

Regional stability compels unity. Qatar will not advance itself by striking an independent alignment with Iranians, Turks and Russians; it needs to view its security as integral to collective Gulf security. The GCC remains the best instrument for regional peace and prosperity and is the only proven hedge against the uncertainty of the 21st century. The UAE irrevocably shares interests with Qatar but also sees the essentiality of regional unity against today's complex threats. Qatar must see its enduring interests remain with the Nine. Strategic leaders will cite this crisis in the decades to come as the key moment when the visions of a prosperous future were guaranteed by wisdom.

Staying Ahead of Evolving Threats in the Future Battlespace

The future battlespace looks like it will be wrought with threats unimagined a few years ago. These days' jammers scramble communications, while cyber attackers sow confusion and waves of hypersonic drones threaten a carrier group on the open sea. With such attacks increasing steadily, what can be done to combat them?

At the recently concluded International Paris Air Show, Raytheon showcased technologies to block and counterpunch enemy attempts to blind, choke and rout. The innovations cover the spectrum, from advanced cyber defence to increased processing power for radars to networked defences.

"This is Star Trek-type technology where you will have one box that's doing a tremendous number of things, integrating them and doing it super-fast, so it will make decisions that are not possible today," said Raytheon engineer Duane Estrada.

Some breakthroughs come in thin packages, like computer chips that can be stacked on small wafers to make radars smarter. Stacked computer chips boost processing power; they are the building blocks for advanced systems and networks that can identify and target incoming threats. Such networks cover land, sea, air, space and cyber, connecting the many layers of missile defence that protect the U.S. and its allies, including Raytheon's Patriot Air & Missile Defense System and its Standard Missile series of interceptors.

Patriot Air & Missile Defense System

Since it was first fielded, Raytheon's Patriot has been used by five nations in more than 200 combat engagements against manned and unmanned aircraft, cruise missiles, and tactical ballistic missiles. Since January of 2015, Patriot has intercepted more than 100 ballistic missiles in combat operations around the world; more than 90 of those intercepts involved the low-cost Raytheon-made Guidance Enhanced Missile family of surface-to-air missiles.

Those engagements were possible because Patriot is built on a foundation of more than 3,000 ground tests and over 1,400 flight tests.

Each and every time Patriot is tested or live fired, engineers uncover new ways to further improve or enhance the system. The improvements are necessary because the threat is constantly changing and becoming more sophisticated.

The result of the improvements and enhancements is that today's Patriot is

advanced, modern, and capable of defeating the full spectrum of threats. It shares the same name and basic purpose of the Patriot of the past, but that is where the similarity ends.

Patriot has continually embraced new technologies to stay ahead of evolving threats. As a result, with a few small exceptions, such as heaters and cooling fans, the bulk of the system has been modernised over the past 17 years.

This is possible because Patriot's architecture is flexible and designed in a manner that allows it to be continually upgraded and improved.

Members of the Patriot partnership, a 13-nation consortium of Patriot users, has invested significantly in improvements, enhancements and upgrades over the past 20 years, to fund this ongoing modernisation.


Raytheon has built more than 220 Patriot fire units

Raytheon has built more than 220 Patriot fire units and delivered them to customers in 13 nations. Many of those countries have chosen to take advantage of Patriot's flexible architecture and upgrade their systems.

360-degrees of protection

Global Patriot has a defined growth path that will ensure the system continues outpacing the threat through 2048 and beyond. Recently, Raytheon unveiled a prototype radar that incorporates gallium nitride, a revolutionary semi-conductor technology that will enable 360-degrees of protection.

"Future battlefields will require seamless integration and automation technology to connect the layered, complementary sensors that find and track increasingly complex and diverse threats," said Tom Laliberty, Vice President of Business Development for Raytheon Integrated Defense Systems, adding that intelligence and surveillance systems "will need to share critical information in new ways. This will further enhance situational awareness, speed decision-making and deliver comprehensive capabilities when combined with advanced missiles."

Adversaries exploit geography and technology to hide their forces. They are mobile and elusive, concealing themselves from exposure. Paramilitary or terrorist groups could send small drones to attack larger, more organised artillery forces and destroy exposed ground formations. Their ability to move around could make it difficult for missile crews to target these groups.

Wafer-Stacking Technology

The enormous processing power afforded by wafer-stacking technology would give smaller radars and accompanying sensors the power to track and identify concealed targets.

"You reduce the weight and the size by orders of magnitude," Estrada said, adding that the effect also increases processing power by a similar scale.

Difficult surveillance missions, such as tracking and identifying targets deep in foliage, become easier. Such a sensor package employing the wafer-stacking innovation is only two to three years away from reality.

Connected Sensors

As sensors from the high-powered, active-array radars mounted on special mission surveillance aircraft or the infrared eyes of unmanned vehicles become more connected, it will be critically important to protect them from

cyber attacks. Raytheon is now developing the technology that will harden systems aloft and on the ground, to keep hackers from interfering with aircraft crews or battlefield commanders.
The company's advantage is its long experience in military-grade tech, which it is adapting to protect commercial organisations through its investment in the cybersecurity firm Forcepoint.
Future commanders will also fight off attackers using electronic warfare, such as agile signal jamming, to confuse and defeat their adversaries.

Weapons With Smarts

Raytheon equips fighting vehicles that will face future challenges, from the F-35 Joint Strike Fighter, which carries an array of the company's weapons, to the futuristic U.S. Navy destroyer Zumwalt DDG-1000, running on complex systems the company has integrated, to armoured vehicles equipped with Javelin or TOW missiles.

Coyote

The Coyote® unmanned aircraft system is an expendable system that's deployed from an A-size sonobuoy tube or Common Launch Tube to perform intelligence, surveillance and reconnaissance missions while the host aircraft remains in safe airspace.
It's designed to handle reasonably large accelerations during launch, a critical feature for all tube-launch applications. It is also an ideal UAS for improved surveillance imagery, improved targeting capability, near real-time damage assessment and reduced threat to manned aircraft. The system will operate up to one hour and is designed for interchangeable payloads. It is used by the National Oceanographic and Atmospheric Administration for hurricane tracking.
The future can readily be seen in the Coyote unmanned airborne system, which recently demonstrated the capability to launch in a swarm, move in formation thanks to autonomous networking, and fly itself toward a designated end point. The possible uses are endless, from intelligence, surveillance and reconnaissance activity to strikes against moving targets.

Overmatching power

Overmatching power is a central tenet of the Pentagon's Third Offset strategy, which encourages technological innovation to create "overmatch" – overwhelming combat power to either deter adversaries or defeat them outright.
One example of that progression is how Raytheon is expanding its range of land warfare systems designed to provide overmatching capabilities, including systems designed for both "mounted" vehicle and "dismounted" infantry land warfare operations.
Raytheon is building technologies for the conventional conflicts of the future. The company produces, among other products, weapons and sensors for the majority of the infantry and armoured fighting vehicle weapons used by many countries.
Once thought to be obsolete, conventional tank-on-tank warfare and the use of high-end weaponry are plausible for the future. To allow tank crews to counter incoming threats, Raytheon has developed the Quick Kill™ active protection system. One example of a combat-proven, overmatch capability already in service is Raytheon's M982 Excalibur® 155mm guided projectile. It is in service and on order with the U.S. Army and Marine Corps, Australia, Sweden, Canada, the Netherlands and Jordan, and is being considered by other international partners.
Raytheon is developing a new, longer-range weapon based on advanced missile technologies. Long-Range Precision Fires (LRPF) is thin and sleek; it will fire two missiles from a single weapons pod, an innovative and differentiated design that slashes the cost to the customer. The new missile also flies farther and packs more punch.
Raytheon is also pursuing upgrades to existing fighting and armoured vehicles. The idea behind these technologies is to give the warfighters the ability to deter, and whenever necessary, overwhelm an adversary on the battlefield.

The Coyote® unmanned aircraft system is used by the National Oceanographic and Atmospheric Administration for hurricane tracking

Reference Text/Photo:
www.raytheon.com

UMEX, SimTEX 2018 Witness Increase in Exhibition Space

The upcoming editions of the Unmanned Systems Exhibition and Conference (UMEX 2018) and the Simulation Exhibition and Conference (SimTEX 2018) have witnessed strong international exhibitor demand from specialised defence and security companies.

Set to run from 25 to 27 February 2018 at the Abu Dhabi National Exhibition Centre, the dual exhibition is co-organised by Abu Dhabi National Exhibitions Company (ADNEC) and the UAE Armed Forces General Headquarters (GHQ). The events will reportedly see a 25 per cent increase in exhibition space compared to previous editions.

Humaid Matar Al Dhaheri, Group CEO of ADNEC, said, "The strong interest in UMEX and SimTEX from key players in the global defence industry reinforces Abu Dhabi's status as a preferred destination for specialised global exhibitions and conferences. The 25 per cent increase in exhibition space is testimony to ADNEC's ability to drive the expansion of this vital industry through attracting new international events to the emirate and consolidating its existing event portfolio."

He added, "To build on the tremendous success of IDEX and NAVDEX this year and UMEX and SimTEX in 2016, we need to step up our efforts in organising the upcoming editions of the events to reflect the stature and reputation of the UAE."

Al Dhaheri highlighted that ADNEC's talented national workforce and Abu Dhabi's ambitious economic vision have enabled the company to set a benchmark in leading and developing the exhibition sector.

Saeed Al Mansouri, Director of IDEX and NAVDEX, said, "The success of ADNEC's marketing strategy for UMEX and SimTEX 2018 reflects Abu Dhabi's prominent status in the global business tourism arena. We have taken the lead in this vital sector and are no longer competing with the world. We now aim to establish new synergies and explore uncharted areas of specialisation."

He added, "Our global marketing campaign involves attending specialised international defence events, where we connect with decision makers from leading companies in the sector to drive participation in our two exhibitions. Furthermore, we make concerted efforts to maintain harmonious relationships with our partners and exhibitors, and keep updated on the latest developments in the global exhibition industry."

This year, the ADNEC team has participated in several international defence exhibitions including the Association for Unmanned Vehicle Systems International (AUVSI) 2017 exhibition in Dallas, U.S., and the International Defense Technology Exhibition and Conference (ITEC 2017) in Rotterdam, the Netherlands.

In addition, the IDEX stand at the International Defence Industry Fair (IDEF 2017) in Istanbul, Turkey, registered a high footfall from major exhibitors and decision makers in the global defence industry.

Sensor System Upgrade Makes Typhoon More Lethal

A two-year, €45M (£40M) system upgrade contract, which includes capability work by Leonardo, integration activities by BAE Systems and Ministry of Defence trials, will enhance the Typhoon's 'Praetorian' Defensive Aids Sub System (DASS) making the combat jet more deadly in order to meet the Royal Air Force's future operational requirements. The contract is part of a continuous capability upgrade to ensure UK Typhoons can identify and defeat known and emerging threats.

'Praetorian' Defensive Aids Sub System

Praetorian is a suite of protective electronic systems installed inside the Typhoon, which includes sensors and countermeasures, that seamlessly work together to defend the jets from a variety of threats.

The name 'Praetorian' originates from the Praetorian Guard, the feared and elite troops used to protect Roman emperors.

Leonardo leads the EuroDASS consortium (which also includes HENSOLDT, Elettronica and Indra) to provide the Praetorian system, which is a baseline system on the more than 500 Eurofighter Typhoons delivered to date.

The Defensive Aids Subsystem (DASS) is designed to ensure the aircraft will survive the full range of threats enabling mission success.

The DASS is installed internally, without the need to carry flight profile limiting pods, and provides protection against air-to-air and surface-to-air threats.

Enhanced survivability is achieved with an all-round set of self-defence sensors and countermeasures. These will detect and evaluate potential threats at maximum range and then automatically deploy the most effective countermeasures.

The DASS is an integral part of the aircraft fighting equipment and not only provides comprehensive protection but also contributes to the overall platform situational awareness. The passive Electronic Support Measures (ESM) together with the active Missile Approach Warner (MAW) work in harmony with other on-board sensing systems to give timely warning and identification of threats.

The Electronic Countermeasures System (ECM) automatically activates the most suitable on or off-board counter to the threat while the information is displayed graphically on the cockpit multi-function displays. This allows the pilot to further option of manoeuvre or in some cases, manual override. On-board countermeasures cover a comprehensive range of jamming techniques including coherent, non-coherent and anti-monopulse using Digital RF Memories (DRFMs). Off- board countermeasures include Towed Decoys.

The system is provided with the ability for the user to ensure maximum effectiveness in all scenarios by allowing total programmability of mission data.

To cater to the ever-changing threat profiles, the system is designed to allow easy modification for future growth ensuring protection through the 21st century.

The four nation consortium, EuroDASS,

has launched 'Praetorian' as the new brand name for the Eurofighter Typhoon electronic support measures, electronic countermeasures, missile warner and towed decoy elements of the DASS. These systems are fully integrated ensuring the aircraft's survivability against a wide range of threats, while providing continuous situational awareness.

A majority of the UK's new capability enhancement contract will be carried out by Leonardo at its electronic warfare centre in Luton, UK, while integration work and airworthiness clearances will be carried out by the UK's Typhoon prime contractor BAE Systems in Warton, UK.

More than 599 Typhoon jets have been ordered, most recently by Kuwait who contracted with Leonardo in 2016 to procure 28 aircraft. Kuwait will receive the latest (P3E) standard of the Typhoon which will include the Praetorian DASS.

Overall, Leonardo provides more than 60 percent of the avionics for the Typhoon, including leading the consortia responsible for providing the aircraft's radar and infrared search and track (IRST) system. The company is responsible for around 36% of the Typhoon's overall programme value, which includes parts of the aircraft's structure, avionics and on-board electronics.

> The DASS is an integral part of the aircraft fighting equipment

Captor-E (E-Scan) radar

In a further technology development, Leonardo is currently leading the EuroRADAR consortium in the development of the Captor-E (E-Scan) radar for Typhoon. The new AESA radar will further enhance the capability of the aircraft by providing a 60 percent wider field of regard. Kuwait will be the first Typhoon operator to receive the new radar, in line with initial deliveries to the nation.

Brimstone air-to-surface missile

In a recent development, the first live firing of MBDA's Brimstone air-to-surface missile from a Eurofighter Typhoon has been successfully completed as part of ongoing development work to significantly upgrade the capability of the aircraft. The trial is part of work to integrate the Phase 3 Enhancement (P3E) package for Typhoon.

The P3E package forms part of Project Centurion – the programme to ensure a smooth transition of Tornado GR4 capabilities on to Typhoon for the Royal Air Force.

The UK's IPA (Instrumented Production Aircraft) 6 Typhoon conducted the firing with support from the UK Ministry of Defence, MBDA, QinetiQ, Eurofighter GmbH and the Eurofighter Partner Companies – Airbus and Leonardo.

It was designed to test the separation of the low-collateral, high-precision Brimstone weapon when it is released.

Volker Paltzo, CEO for Eurofighter Jagdflugzeug GmbH, said: "Brimstone will provide the Typhoon pilot with the ability to precisely attack fast-moving targets at range, further enhancing the aircraft's already highly potent air-to-surface capabilities."

Andy Flynn, BAE Systems Eurofighter Capability Delivery Director, added: "Through the dedicated work of our teams, and with support from our partners, we have been able to reach this milestone in a short space of time.

Andy Bradford, MBDA Director of Typhoon Integration, said: "Together Brimstone and Typhoon will provide the Royal Air Force and other Eurofighter nations with a world-beating strike capability to beyond 2040."

United Arab Emirates and Saudi Arabia:

Fraternal relations and a firm challenges and risks

The UAE-Saudi relations represent an example of brotherly relations, not only because they are witnessing steady growth in all fields, but also because they represent a strong guarantee for national security in the Gulf and Arab countries in general, given the conformity of views between the two countries on all issues of the region and their constructive and fruitful cooperation in dealing with the challenges facing them. In this issue file, the Nation Shield sheds light on some aspects of these relations and their solid foundations.

The intention of the UAE and Saudi Arabia to establish a joint coordination council in May 2016 was a quantum leap and a new phase in bilateral relations. This Council has not only institutionalized the relations between the two countries and coordinated their reciprocal positions, but it has also launched an effective channel for direct and continuous communication between them, thus helping them to make the necessary decisions to deal with the pressing strategic issues. The mechanism that has been developed to follow up the work of this Council, namely "Al Azm Retreat", in essence confirms the keenness of the two countries to achieve the goals of bilateral goals, preserve the gains of development and reinforce security, stability and well-being.

The Peculiarity of UAE-Saudi Relations

The UAE-Saudi Arabia relations are the result of many historical, leading, economic, security, cultural and societal factors that have contributed to the continuous growth of these relations in various fields. These relations can be addressed as follows:

Historical legacy: The role of the historical factor in the development of bilateral

partnership in the face of

relations was clearly expressed by His Highness Sheikh Mohammed bin Zayed Al Nahyan, Crown Prince of Abu Dhabi and Deputy Supreme Commander of the UAE Armed Forces, when he said: "The UAE-Saudi relations embody the spirit of brotherhood, love and common historical ties." There were many manifestations of co-understanding and harmony in visions between Sheikh Zayed bin Sultan Al Nahyan, may God have mercy on him, and the leadership of the Kingdom of Saudi Arabia. This same spirit exists now between His Highness Sheikh Khalifa Bin Zayed Al Nahyan, And the Custodian of the Two Holy Mosques, King Salman bin Abdul Aziz, in light of their strong faith in the deep-rooted historical brotherly ties between the two countries.

> The UAE-Saudi relations embody the spirit of brotherhood, love and common historical ties

Mutual respect and appreciation: The UAE is well aware of the importance of Saudi Arabia and its role in the region; it always appreciates the efforts exerted by the Kingdom to consolidate the Gulf-Gulf relations and strengthen Arab solidarity. Saudi Arabia also appreciates the role played by the UAE in maintaining the foundations of security and stability in the region.

Deep and strong common interests between the two countries: This is a major basis for the development of bilateral relations between them. These interests vary from political and economic aspects, to trade and development, and are mainly aimed at deepening the gains of development and prosperity for the peoples of the two countries.

Common understanding and united positions on the issues of the region and the world: The relations between the two countries would have not progressed so rapidly unless their vision was identical and they shared mutual understanding and coordination, as was evident in how the two countries dealt with many issues and files during the past few years at the Gulf, Arab, regional and international levels.

Constructive cooperation in facing the challenges of the region: The mutual understanding and the identical positions between the two countries translated into effective cooperation between them, and played pivotal roles in the maintenance of national, Gulf and Arab security.

Joint Coordination Council .. A qualitative shift of UAE-Saudi relations

In fact, the Saudi-UAE Joint Coordination Council is of increasing importance in view of numerous considerations, most notably:

1. Institutionalize the relations between the two countries and work towards further coordination of bilateral positions.

2. Preserve the gains of development, security and stability in both countries. This Council represents a wall of protection that protects the gains and achievements of the UAE and Saudi people in facing challenges, including foreign interference in the affairs of the countries of the region.

3. Enhance coordination and consultation between the two countries. 4. Enhance the strategic partnership between the two countries.

Al Azm Retreat .. an innovative mechanism to achieve the objectives of the Joint Coordination Council

The United Arab Emirates and Saudi Arabia have not only established the Joint Coordination Council, but also developed a creative mechanism to implement its objectives on the ground and to develop bilateral relations in all fields. The retreat was based on the directives of HH Sheikh Khalifa bin Zayed Al Nahyan, President of the UAE, and His Royal Highness King Salman bin Abdulaziz Al Saud, to strengthen the historical relations between the UAE and Saudi Arabia and to develop a long-term road map.

The importance of Al Azm Retreat emanates not only from the fact that it discusses the various areas of cooperation between the two countries in detail, but also works to find solutions to any obstacles that affect the course of cooperation. It also paves the way for creating an appropriate working environment that

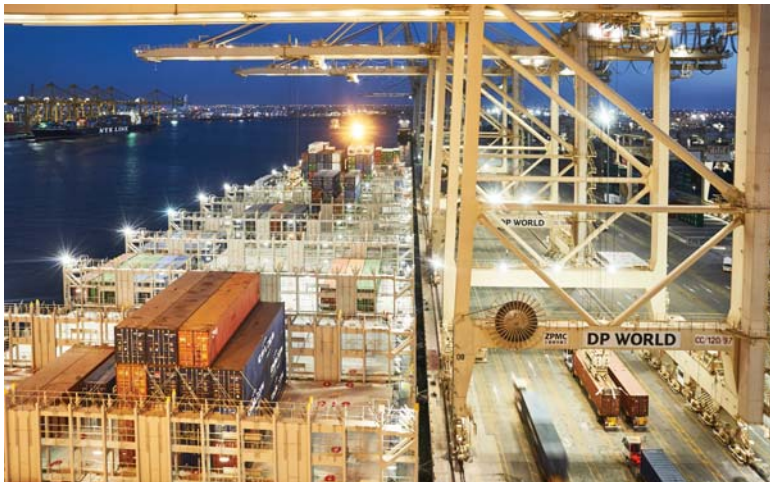
contributes to building partnership with all vital sectors and institutions of the state in both countries to deal with and manage crises effectively.

A growing and comprehensive strategic partnership

The areas of bilateral partnership between the two countries include various political, economic, social and military aspects. This can be explained as follows:

1 – The Political aspect: The political understanding between the two countries during the past years has reached an unprecedented level. The most prominent aspect was the common vision of the two sides for preserving the security of the region, safeguarding its gains and interests, as well as the solidarity of the UAE with the Kingdom of Saudi Arabia in its positions and policies in order to maintain its security and stability. The two countries have been successful in rebalancing US-Gulf, Arab and Islamic relations in general. They have played a key role in restoring relations between the United States and the Arab and Muslim worlds, defusing tensions and bringing the United States and the Muslim world closer together to build a civilized alliance against terrorism and enemies of civilizations and religions. Hence the Islamic-American Summit in Riyadh conveyed this message and emphasized that the UAE and Saudi Arabia are leading the regional confrontation against extremism and terrorism.

2 - Economic and Commercial Aspect: The trade and economic relations between the UAE and Saudi Arabia are the strongest among their counterparts in the GCC countries. They are witnessing steady growth in many areas. Among the most prominent indicators of this is the fact that the UAE is one of the most important trading partners of the Kingdom in the Arab region in general and the GCC in particular. The volume of trade exchange between the two sides is the highest among the GCC countries, amounting to AED 84 billion, according to the latest statistics. The UAE is at the forefront in terms of investments in Saudi Arabia with investments exceeding US $ 9 billion in many sectors, most notably industry and services. Moreover, tourism between the two countries plays an important and vital role in enhancing trade and economic ties between them. The pace of cooperation between the two countries has increased in the field of renewable energy and clean technologies. Both countries share a lot of common factors. They are both the world's top energy suppliers, seeking to boost



this position while keeping pace with the growing domestic demand for energy.

3 – The security field: it is one of the most important areas of strong partnership between the two countries, considering that both countries share one vision regarding the challenges and threats facing the countries of the region. They are cooperating to face those threats, and leading efforts to achieve security and stability in the region. The two countries also play a key role in the fight against terrorism, both through their participation in the international coalition against Da'esh in Iraq and Syria, and through their strategies to counter terrorism.

4. The military field: There is defense and military cooperation between the two countries, translated into joint exercises, like Raad Al Shamal exercise in King Khalid Military City in Hafr Al Batin, north of Saudi Arabia. It was the largest military exercise in terms of the number of countries. HH Sheikh Mohammed bin Zayed Al Nahyan, Crown Prince of Abu Dhabi, on the occasion of his participation in the military parade which was held at the end of "Raad Al Shamal", highlighted many issues related to the nature and objectives of military cooperation between the two countries. He declared that the close military cooperation between the

two countries is a safety valve in the face of any challenges that may threaten the region. He pointed out that the UAE and Saudi Arabia have a comprehensive vision of the challenges that may face the region. Raad al-Shamal exercises reveal that the countries of the region are capable of transforming challenges into opportunities through cooperation and coordination of their capabilities.

UAE-Saudi relations: a guarantee for Gulf and Arab national security

Many experts agree that the strong and strategic relations between the UAE and Saudi Arabia constitute a cornerstone of collective security in the GCC, and Arab national security at large. The UAE-Saudi partnership has positive impact on Gulf and Arab national security in the following aspects:

1 - Proactive confrontation of the sources of threat facing the security of the Gulf Cooperation Council States. The two countries recognize the importance of proactive action to face the challenges and threats to the security of the GCC countries and to address regional projects that harm Arab interests.

2. Maintaining cohesion within the GCC and correcting any policies that contravene the principles of the General Charter of the Council. In this context, comes the decision of the UAE and Saudi Arabia, together with the Kingdom of Bahrain and the Arab Republic of Egypt, on June 5, 2017, to sever diplomatic relations with Qatar.

3 - Facing the growing Iranian expansion in the region. Since the signing of the "Lausanne" nuclear agreement with the group (1 + 5) in July 2015, Tehran has been trying to assert its hegemony over the region, and exercise its interventions in the affairs of other countries.

4 - Leading Arab Coalition in Yemen (Al Hazm Storm and Restoring Hope 2015). The UAE participated in the Arab Alliance for the Promotion of Legitimacy in Yemen, led by Saudi Arabia, and was the second country in this process in terms of the power of participation and political and military influence.

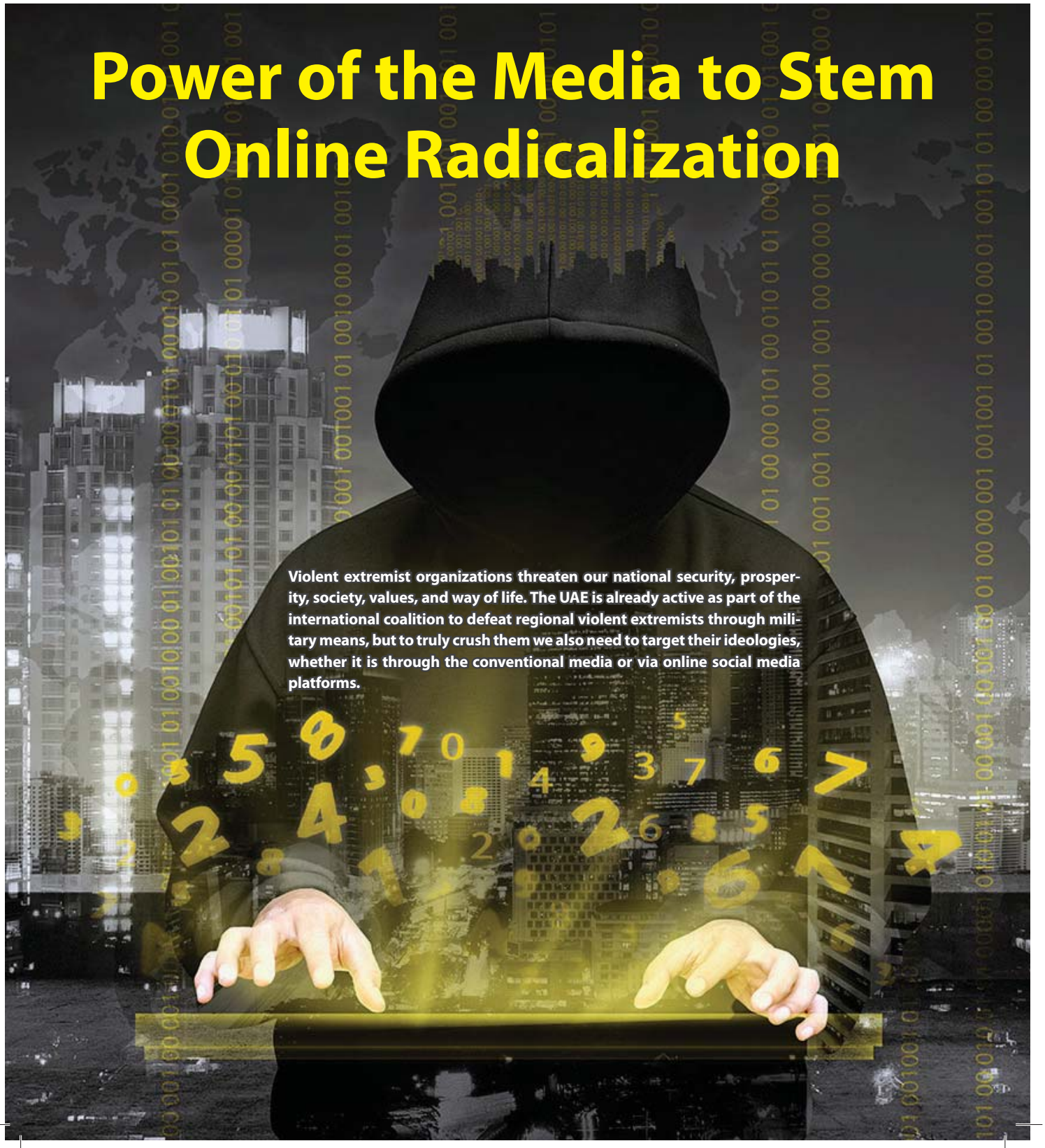
5. Joining the regional and international efforts to counter extremism and terrorism. The two countries took part in the US-led international coalition against the organization of "Da'esh" in 2014, out of their deep awareness that Da'esh is a threat not only to Iraq, but also to the GCC countries.

Conclusion

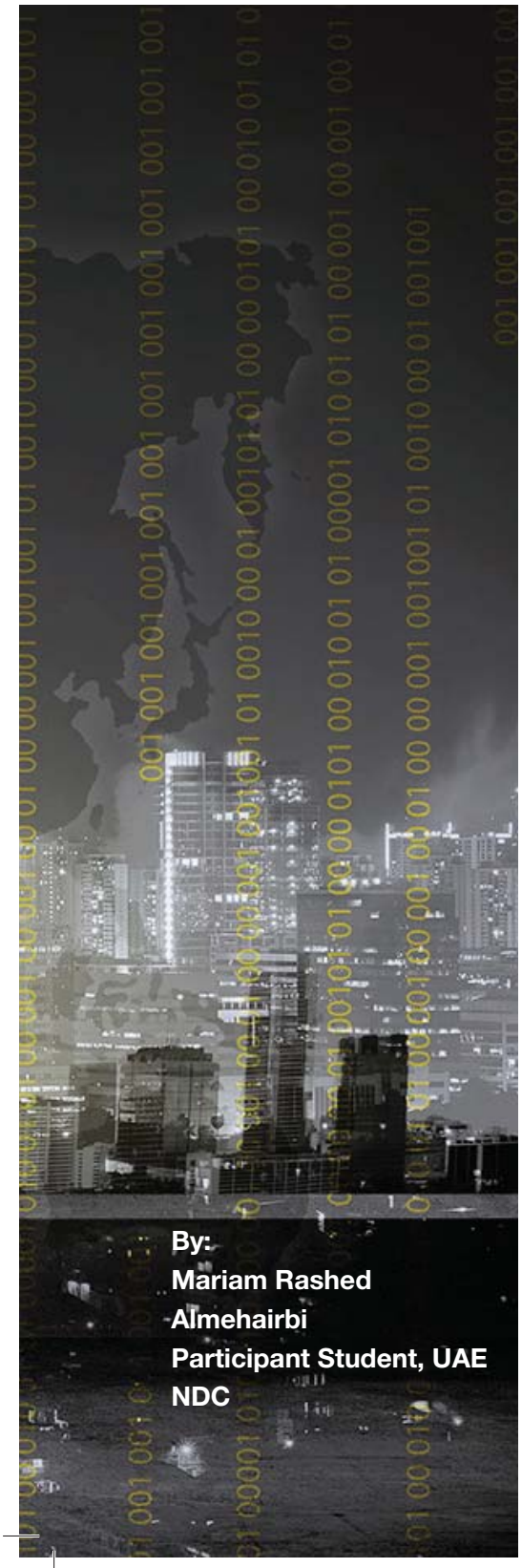
The UAE and Saudi Arabia have succeeded in building a unique model for brotherly relations, which aims not only to promote the interests of the two brotherly peoples and to maintain their overall security, development, social and cultural achievements, but also to achieve long-term strategic goals for the benefit of all the peoples of the region that aspire to security, stability, peace, prosperity and development. They look forward to the two countries to continue their constructive role in restoring the missing security in many countries of the region, and to support construction and reconstruction projects in areas of crisis and conflict.

There is no doubt that betting on the Saudi-UAE alliance in achieving the aspirations of the peoples of the region for security, development and stability has not come from a vacuum. It is based on firm facts and realities connected with their historical relations, comprehensive strategic partnership and their identical positions and visions. Besides, they enjoy great international esteem and confidence. This highlights the fact that the two countries are able, through cooperation and coordination with other Arab countries, particularly the Arab Republic of Egypt, to restore balance and maintain security and stability in the Arab region and to ensure the interests of their peoples.

Power of the Media to Stem Online Radicalization



Violent extremist organizations threaten our national security, prosperity, society, values, and way of life. The UAE is already active as part of the international coalition to defeat regional violent extremists through military means, but to truly crush them we also need to target their ideologies, whether it is through the conventional media or via online social media platforms.



By:
Mariam Rashed Almehairbi
Participant Student, UAE NDC

It is essential to diagnose the problem, at the outset of any strategic exercise. I believe that when we think of countering the influence of violent extremists we need to go beyond the military strategy, as we have seen that violent extremist ideologies tend to survive, even if the organization is weakened. An example is the so-called Islamic State of Iraq and Syria (ISIS) appearing after al-Qa`ida had been weakened. We need to target the foundational influence of those violent extremist organizations. The fight against terrorist groups requires a holistic approach that not only defeats them in the battleground, but also in the virtual space where they have become increasingly influential and succeeded in delivering their messages. Media radicalization has emerged as one of the global threats in today's world, and no country is immune to its dangers. This is why it is increasingly important for the UAE to protect its society from such influence through building resilience in its community and strengthening awareness within its society.

The timeless nature of radicalization

The concept of influencing through information is not a new one. It is an age-old concept that has been used in different areas and cultures to gain power and spread influence. To illustrate, one example harkens back to the Mongols under Genghis Khan, who realized the power of propaganda as early as 1221 AD. Although known to be a ruthless warrior, he realized that terror was best spread not by the depredations of warriors, but by the pens of scribes and scholars. In August 1221, the Mongols demanded one hundred thousand sheets of paper, where the people were allowed to write freely and circulate the worst and most incredible stories about Genghis Khan and the Mongols. Each victory released a flood of new propaganda and the belief in the Khan's invincibility spread, causing a tremendous impact across Central Asia. As a result, many cities would surrender without even fighting to escape the horrors of the stories that they heard (Weatherford, 2004). The huge volume of paper demanded shows the important role of information as an ancient instrument of power and influence in the Khan's campaign. It helped him in spreading fear and terror, and created an aura of invincibility enabling the Golden Horde to win battles and take over cities with

minimal opposition.

Another example of the power of information is Sayyid Qutb's influential book Milestones, (Clark, 2010) whose teachings and ideas are still inspiring today's extremists. Qutb's plan calls for action to recreate his version of the Muslim world in a narrative that many violent extremist organizations use even today. From the time of Sayyid Qutb in the Muslim Brotherhood, to al-Qa`i to ISIS, the leaders, names, and organizations change, but there are similarities. They all share the same core beliefs that violence and fear of violence are the most effective means. They all have simple, effective narratives that succeed in influencing an audience to be radicalized. And they have all managed to market complicated ideas into short, emotional narratives in which they use their own selective misinterpretations of religion as a basis to spread terror and to achieve their long-term objectives.

A closer look at ISIS

ISIS is not the first terrorist organization that uses the media to implement its operations, but its skillful and sophisticated use of the media has made it stand out more than others. ISIS's communication strategy aims to persuade citizens the world over that their idea of 'jihad' is a religious duty that is necessary to restore the 'Caliphate'. Their idea is very far from the true ideals of Jihad in Islam. However, their narrative portrays ISIS as a defender of social justice, showing that they are increasing in power and that their victory is imminent. According to Maan (2015), narratives are about meaning, not truth, just like poetry, truth is irrelevant to poetry, what is relevant is whether it reflects and touches the emotional experience of the audience. In the case of ISIS, their narrative is what makes their communication effective, their key message of

> The concept of influencing through information is an age-old concept

"Islam is under attack" is supported by their narrative which includes attacks on the Muslim population from the 12th century crusades to the modern day conflicts.

To amplify their messages, ISIS uses social media platforms to spread their propaganda to help them in achieving their objectives. Potential recruits can communicate via Facebook for instance, with ISIS fighters who would share their experiences with them, and facilitators would contact them to explain how they could join ISIS in Syria and Iraq (Farwell, 2014). ISIS has also succeeded in influencing their followers to commit horrific acts of violence streamed on social media platforms. In this manner they have persuaded an estimated 30,000 people from more than 85 countries to travel to hostile war zones in Syria and Iraq and induced other supporters to commit acts of violence in their home countries on ISIS's behalf (Selby, 2016). Researchers who analyzed online records of 196 pro-ISIS groups in 2015 found that although the members, whose numbers exceeded only 108,000 probably never met, they held great manipulation over their members, and were able to get these adherents, even ones with no history of extremism, to execute terrible crimes

such as the deadly mass shooting in the nightclub in Orlando (University of Miami, 2016). Not only has ISIS succeeded in gaining followers and influencing them through social media, but ISIS' use of media has inspired even the more traditional terrorists, such as the Taliban, who used to oppose media and ban it, to use social media as a tool to communicate with their supporters, spread their messages and raise the morale of their fighters (Mashal, 2016).

How can we protect our society from the threat of online radicalization?

The UAE has already taken steps to counter online radicalization, through its laws, policies, and establishment of two centers Hedaya and Sawab, based in Abu Dhabi to counter terrorism.

Hedayah center is a 'think and do' tank, which serves as the premier international hub for Counter Violent Extremists policy makers, practitioners and researchers to enhance understanding and share good practices across the globe to promote tolerance, stability and security (Hedayah, 2015). The anti-ISIS coalition led by the US also established the Sawab center to counter extremist propaganda and mes-

saging in the online space. The Arabic meaning for "Sawab" is doing the right thing, or being on the right path. The center's main objectives are to provide facts about ISIS via the online platforms, counter false claims, and strengthen the credible voices of influencers that speak about ISIS (The National, 2015). They launch one campaign every month on the social media aimed to counter ISIS's messages, or to promote moderate Islam.

If we look at the volume of ISIS propaganda, they supersaturate the market through distributing their content to their diverse target audience by various formats including videos, magazines, essays, news bulletins, audio programs with an average of 38 pieces of content a day in dozens of languages and dialects (Selby, 2016). The question remains: are the efforts currently undertaken are enough in comparison to the ISIS propaganda that is flooding the online domain? I believe that the key to coming up with an effective strategy to fight online radicalization requires a holistic approach that not only focuses on online platforms, but on education, awareness and society, below are some details of the recommended strategy:

Assess and analyze: gaining a deeper understanding of the problem would help in coming up with better strategies. For instance, in the case of ISIS who have been the best in using online radicalization to their advantage, it is important to understand why and how they are so effective. What are their strengths and weaknesses? In order to better understand ISIS, one of the most important elements that needs to be analyzed is the ISIS narrative—what makes it strong? Why does it appeal to thousands of people around the world? According to Maan, "Because most of us are not conscious of the power of narrative, narrative is even more powerful. It is a tool that we can use, and if we don't it will use us." Therefore, understanding the power of the narrative is essential to counter-terrorism efforts "There is general agreement that there is an urgent need to develop effective counter-terrorism narratives while simultaneously destabilizing and exploiting weaknesses in terrorist recruitment narratives" (Maan, 2015).

Prevention: is key in the fight against terrorism, and prevention can happen through educating and raising awareness within the society to protect its youth from falling victim to radicalized ideologies. In comparison to military means that are used to counter terrorism, education and awareness assumes modest costs, and the benefits of education programs will reflect positively in the society for a longer term on its own merits.

Develop and amplify the UAE's timeless narrative: Our approach needs to go beyond the current terrorist groups that exist, it needs to be timeless in nature in order to be influential and ready for current and future threats. The strength of the violent extremists' ideologies stems from their narratives this is why it is vital to come up with our own strong narrative that reflects the true values of Islam, since in its absence the space is being filled with extremists' ideologies and propaganda. This does not have to be a counter-narrative, it could be achieved by simply amplifying and spreading the positive values and messages that already exist within the UAE's society.

Finally, information is power, and there is an opportunity for the UAE media to develop a strategic communications narrative that projects positive values. A transcendent, holistic approach that focuses on building a strong, educated, resilient society will not only help us in winning the war of ideologies, but it will better prepare us to face the unpredictable threats of the future.

Reference:
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Darpa Searches For Intelligent Imaging Sensors

The U.S. Defense Advanced Research Projects Agency (DARPA) is looking for research proposals that can demonstrate multi-functional imaging sensors reconfigurable through software.

Proposers will build around a common digital framework, customisable for specific applications. DARPA is seeking proposals for both passive and active modes.

Also of interest are proposals that develop adaptive algorithms for the sensors, which optimize information collection in real time.

U.S. military researchers are already working with four defence contractors to develop software-reconfigurable multi-function imaging sensors.

The idea is to create sensors with simultaneous and distinct imaging modes, providing advanced capabilities that previously required several different sensors.

DARPA has awarded contracts to DRS Network & Imaging Systems, BAE Systems' Electronic Systems and Lockheed Martin Missiles and Fire Control and Voxtel Inc.

The eyes have it

By making a detector's pixels smarter than ever, DARPA aims to lay the foundation for multi-purpose imaging sensors that behave like many types of eyes at once.

Picture a sensor pixel about the size of a red blood cell. Now envision a million of these pixels—a megapixel's worth—in an array that covers a thumbnail.

Take one mental trip: dive down onto the surface of the semiconductor hosting all of these pixels and marvel at each pixel's associated tech-mesh of more than 1,000 integrated transistors, which provide each pixel with a tiny re-programmable brain of its own. That is the vision for DARPA's new Relmagine program.

DARPA aims for a single, multi-talented camera sensor that can detect visual scenes as familiar still and video imagers do, but that also can adapt and change their personality and effectively morph into the type of imager that provides the most useful information for a given situation.

This could mean selecting between different thermal (infrared) emissions or different resolutions or frame rates, or even collecting 3-D Light Detection and Ranging (LIDAR) data for mapping and other jobs that increase situational awareness. The camera ultimately would rely on machine learning to autonomously take note of what is happening in its field of view and reconfigure the imaging sensor based on the context of the situation.

The future sensor DARPA has in mind would be able to perform many of these functions at the same time, because different patches of the sensor's "carpet" of pixels could be reconfigured (by software) to work in different imaging modes.

BAE Systems HAMMER™ Precision Targeting System

The TRIGR™ system ® gives deployed warfighters an advantage in locating enemy targets

That re-configurability should enable sensors to toggle between different sensor modes, from one lightning-quick frame to the next. No single camera can do that now.

A primary driver here is the shrinking size and cost of militarily important platforms that are finding roles in locations spanning from orbit to the seas.

With multi-functional sensors like those that may come out of a successful ReImagine program, smaller and cheaper platforms would provide a degree of situational awareness that today can only come from suites of single-purpose sensors fitted onto larger airborne, ground, space-based, and naval vehicles and platforms. With more extensive situational awareness comes the most important payoff: more informed decision-making.

Developing the layers of complexity

One key feature of the ReImagine programme is that teams will be asked to develop software-configurable applications based on a common digital circuit and software platform.

During the four-year programme, MIT-Lincoln Laboratory—a federally funded research and development centre (FFRDC), whose roots date back to the WWII mission to develop radar technology—will be tasked to provide the common reconfigurable digital layer of what will be the system's three-layer sensor hardware.

The challenge for successful proposers ("performers" in DARPA speak) will be to design and fabricate various megapixel detector layers and "analog interface" layers, as well as associated software and algorithms for converting a diversity of relevant signals (LIDAR signals for mapping, for example) into digital data.

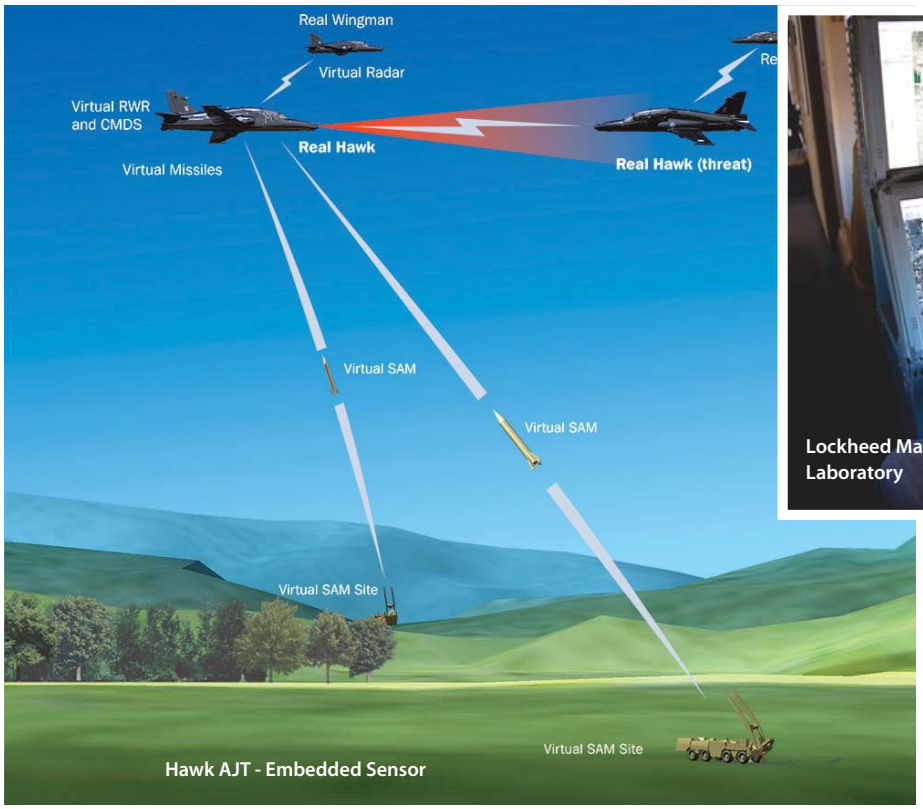
That digital data, in turn, should be suitable for processing and for participation in machine learning procedures, through which the sensors could become autonomously aware of specific objects, information, happenings, and other features within their field of view.

One reason for using a common digital layer is the hope that it will enable a community developing "apps" in software to accelerate the innovation process and unlock new applications for software-reconfigurable imagers.

Gathering the most useful information

In follow-on phases of the programme, performers will need to demonstrate portability of the developing technology in outdoor testing and, in DARPA's words, "develop learning algorithms that guide the sensor, through real-time adaptation of sensor control parameters, to collecting the data with the highest content of useful information."

That adaption might translate, in re-



Hawk AJT - Embedded Sensor


Lockheed Martin Airborne Multi-INT Laboratory

sponse to visual cues, into toggling into a thermal detection mode to characterise a swarm of UAVs, or into hyper-slow-motion (high-frame rate) video to help tease out how a mechanical device is working.

Contractors must also try to develop algorithms that learn to collect the most valuable information when the sensor can be configured for a variety of measurements.

The objectives of the ReImagine programme are to demonstrate that a software-reconfigurable imaging system can enable revolutionary capabilities.

Performers must present a new approach to application development that is more similar to field programmable gate array (FPGA) based design than to application-specific integrated circuit (ASIC) design, and to develop the underlying theory and algorithms that learn to collect the most valuable information when the sensor can be configured for a variety of measurements.

Optimised for all sensors and spectral bands

The ReImagine programme aims to demonstrate that a single ROIC (Readout Integrated Circuit) architecture can be configured to accommodate multiple modes of imaging operations that may be defined after the chip has been designed.

With the use of 3D integration, it should be possible to customise the sensor to interface with virtually any type of imaging sensor (e.g. photodiode, photoconductor, avalanche photodiode, or bolometer) and to optimise it for any spectral band (e.g. ultraviolet (UV) through very long-wave infrared (VLWIR)).

More importantly, it will be possible to adapt the mode of operation either through manual user control, through preset routines that can change many times per second, or in response to context derived from the scene being observed.

For example, a single imager could present simultaneous ROICs that can run at high resolution, or at high frame rate. ReImagine ROICs will also demonstrate that efficient computation within an ROIC can enable real-time analysis on much more complex scenes than traditional systems.

ReImagine will build on this architecture to develop a concept of operation, the application requirements, the modes of operation, and the algorithms that will be used.

Revolutionary capabilities

In addition to multiple passive imaging functions, the ability to incorporate range detection into a high resolution, low noise imaging system offers a potential revolutionary capability.

LIDAR systems today are predomi-

nantly scanning devices that contain large moving components and do not provide high quality context imagery. 2D imaging LIDAR systems have been demonstrated and are able to acquire 3D imagery in framing or asynchronous modes.

Both direct detect and coherent receiver arrays have been demonstrated, each with distinct advantages for different applications. However, in all cases, high data rates limit the spatial resolution of the sensor, and the demonstration of both passive imaging and active LIDAR modes in a large (> 1 Megapixel) array has not been demonstrated.

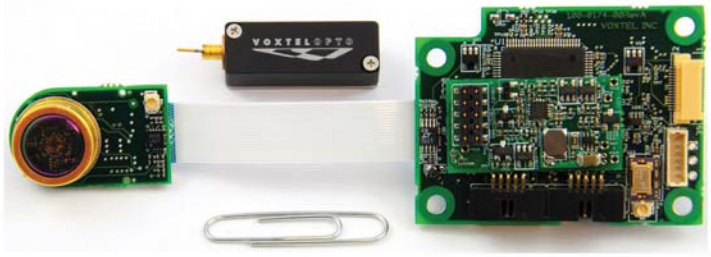
A ReImagine dual-mode sensor would provide the ability to collect high data rate LIDAR measurements within a configurable ROI, while continuing to measure passive context imagery.

"Even as fast as machine learning and artificial intelligence are moving today, the software still generally does not have control over the sensors that give these tools access to the physical world," said Jay Lewis, program manager for ReImagine.

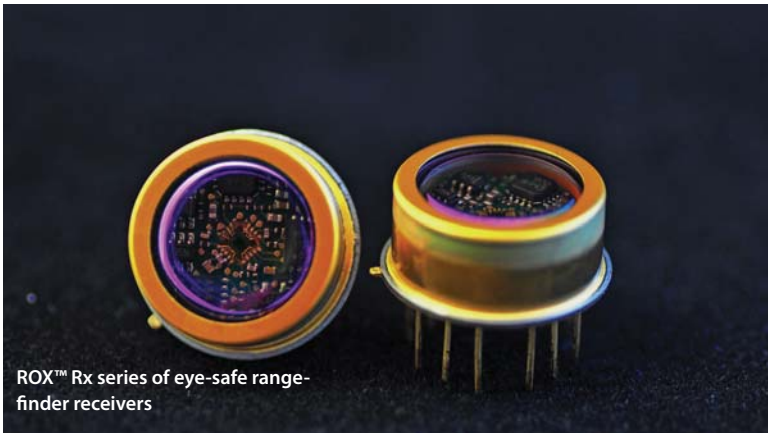
"With ReImagine, we would be giving machine-learning and image processing algorithms the ability to change or decide what type of sensor data to collect."

Importantly, he added, as with eyes and brains, the information would flow both ways: the sensors would inform the algorithms and the algorithms would affect the sensors.

Although defence applications are foremost on his mind, Lewis also envisions commercial spin-offs. Smart phones of the future could have camera sensors that do far more than merely take pictures and video footage, their functions limited only by the imaginations of a new generation of app developers, he suggested.



ROX™ series eye-safe micro-laser rangefinder (LRF) module



ROX™ Rx series of eye-safe rangefinder receivers

British engineers at BAE Systems' Advanced Technology Centre are investigating a 'smart skin' concept which could be embedded with tens of thousands of micro-sensors. When applied to an aircraft, this will enable it to sense wind speed, temperature, physical strain and movement, far more accurately than current sensor technology allows.

The revolutionary 'smart skin' concept will enable aircraft to continually monitor their health, reporting back on potential problems before they become significant

On May 30, Lockheed Martin received a contract for a potential reconfigurable imaging project worth $10.2 million; on June 5, DRS received a $10.1 million potential contract; on June 1, BAE Systems received a potential $7.5 million contract. May 30 saw Voxtel received a potential $5.2 million contract.

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SKELDAR V-200 : Smart Thinking Makes A Difference

SKELDAR V-200, a remotely piloted aerial system, specialises in intelligence gathering and imagery for civilian and military missions. UMS SKELDAR is a joint venture between Saab and UMS Aero Group AG, a Swiss supplier of tactical UAVs.

UMS SKELDAR has purchased the SKELDAR V-200 – the NATO-compliant heavy fuel engine rotary UAV (unmanned aerial vehicle). This multi role platform has become the flagship aircraft and is the key focus for the business going forwards. UMS AERO – the Swiss partner – has developed in partnership with German-based ESG the R350, a smaller, modular unmanned helicopter. This rotary platform is also available with a heavy fuel engine and is an ideal trainer as an introduction to the SKELDAR V-200 or for a range of applications such as police or security. Being under 150kg Maximum Take-Off Weight (MTOW), the R-350 requires only national certification, adding to its operational capabilities. UMS AERO also includes a legacy fixed wing portfolio.

SKELDAR V-200 medium-range UAV

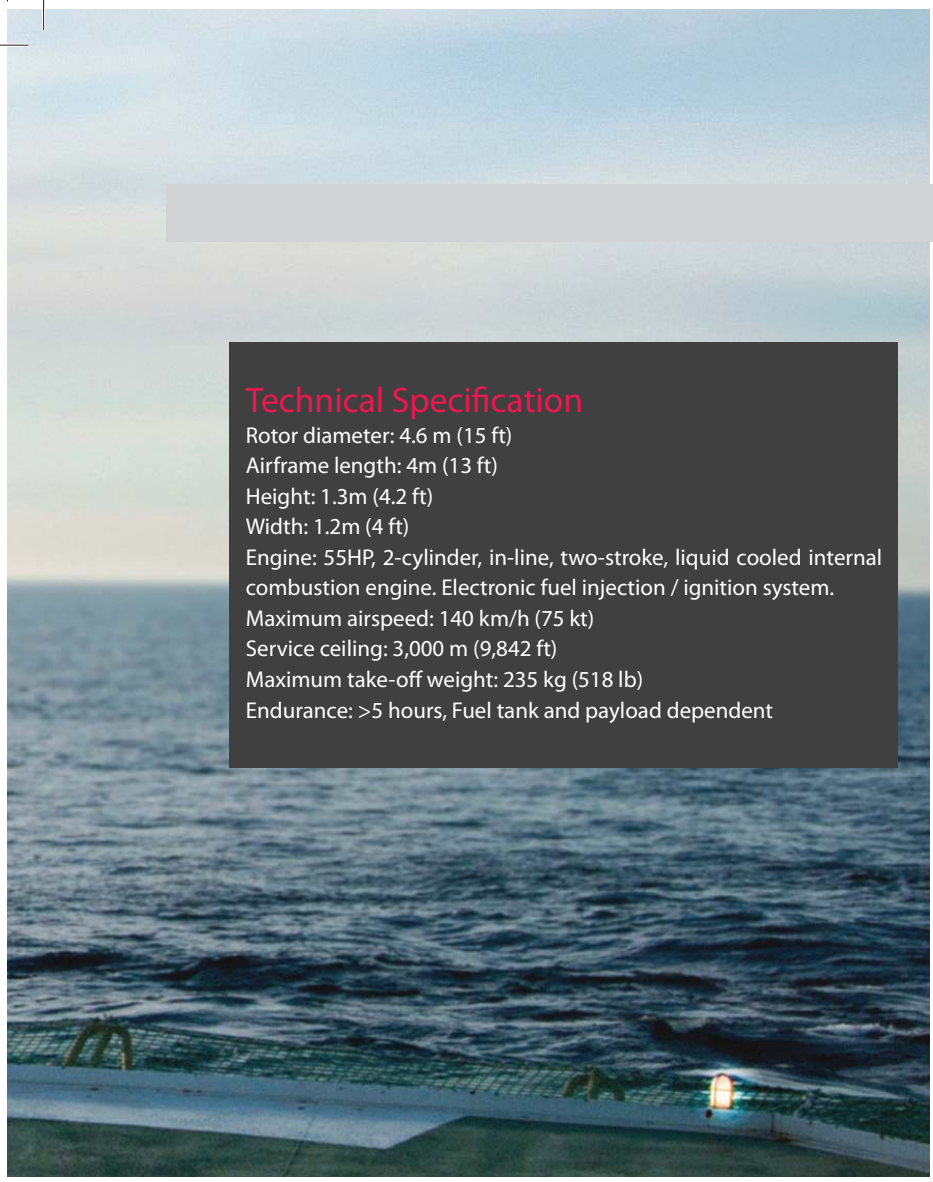
Used in a wide range of applications such as reconnaissance, identification, target acquisition and electronic warfare, SKELDAR V-200 medium-range UAV can hover for hours while providing real-time information to a control station or remote video terminal. The compact solution is fully autonomous, controlled by high-level-commands such as "Point and Fly" and "Point and Look".

The Virtual Take-Off & Landing (VTOL) system has a common control concept and user interface for command, control and payload management. It is equipped with multiple capabilities including surveillance and 3-D mapping.

Unmatched technology

SKELDAR V-200 is maritime ready. On watch, all the time, real time and unmatched in its class. It is an open interface to Battlefield Management System (BMS) and C4ISR systems, and is also 4865 STANAG compliant, making it easier to implement on any maritime vessel.

With multiple payload options, robust engineering and uniquely incorpo-



Technical Specification

Rotor diameter: 4.6 m (15 ft)
Airframe length: 4m (13 ft)
Height: 1.3m (4.2 ft)
Width: 1.2m (4 ft)
Engine: 55HP, 2-cylinder, in-line, two-stroke, liquid cooled internal combustion engine. Electronic fuel injection / ignition system.
Maximum airspeed: 140 km/h (75 kt)
Service ceiling: 3,000 m (9,842 ft)
Maximum take-off weight: 235 kg (518 lb)
Endurance: >5 hours, Fuel tank and payload dependent

rating heavy fuel, SKELDAR V-200 is the perfect Unmanned Aerial Vehicle (UAV) for maritime and naval operations.

It can be operated by two people inside the ship without additional material or media for take-off. Controlled by the shipboard crew, there's no need for a dedicated UAV crew. The operator can use Point-and-Fly or Point-and-See to guide the UAV.

Once the route is set, the UAV autonomously flies towards the target, through assigned way points, and delivers real-time data to the control station and remote video terminals.

A number of Commercial Off-The-Shelf (COTS), high-resolution Electro Optical/Infrared (EO/IR), Synthetic Aperture Radar (SAR) and Electronic Warfare (EW) sensors are available.

Reliable fuel systems

At sea there is no room for error, and the SKELDAR V-200 heavy fuel engine makes it a UAV of choice for navy commanders or any maritime installations. This advanced engine provides additional landing and take-off assurance in environments where conventional fuels are prohibited. The SKELDAR V-200 uses JP-8, a kerosene-based fuel (NATO code F-34).

At home on land or sea

This flexible rotary VTOL is suited to a range of military and civilian applications from oil exploration platforms and Search and Rescue (SAR) operations to C4ISR missions from battlefield situations, border surveillance and security patrols. Equally at home at land or sea, the V-200 is recognised as a best-in-class VTOL in its endurance segment.

STANAG 4865 compliant

The fact that it is not just an open interface to Battlefield Management System (BMS) and C4ISR systems, but also 4865 STANAG compliant, makes it easier to implement on any maritime vessel. Designed for civilian and military missions, this unmatched Virtual Take-Off & Landing (VTOL) system benefits from a common control concept and user interface in the context of command, control and payload management. Equipped with multiple capabilities including surveillance and 3-D mapping, UMS SKELDAR's drones provide an edge in any environment – day or night.

Low Life-Cycle Costs

Developed with a low life cycle cost, the modular design enables system customisation and functional development, with air maintenance carried out at unit level. Compartments can be easily accessed for service, maintenance and payload reconfiguration.

From hard to reach terrain, to ship borne operations, SKELDAR V-200 provides optimum efficiency and safety across military and civilian missions, including endurance hover functionality. Requiring no runway, this UAV provides extremely fast take-off and landing, and its agile and readily deployable flight performance compares to other compact fixed wing UAV systems.

Typical EO/IR

Electro-Optical/Infrared (EO/IR) gimbals provide advanced wide-area situational awareness and intelligence gathering through collection, identification, categorisation and geo-location of static and moving objects of

SKELDAR V-200 gathers signals and communication intelligence

interest. Flexible and highly versatile, the SKELDAR V-200 Remotely Piloted Aircraft System (RPAS) is truly multi-role, and ideal for a wide range of applications such as Reconnaissance, Identification, Target Acquisition and Electronic Warfare.

This UAV gathers signals and communication intelligence. A number of Commercial Off-The-Shelf (COTS) High resolution Electro Optical/Infrared (EO/IR), Synthetic Aperture Radar (SAR) and Electronic Warfare (EW) sensors are available. Airborne communications intelligence significantly improves the efficiency of monitoring and intelligence missions.

High-res imagery

Synthetic Aperture Radar (SAR) uses the flight path of the platform to simulate an extremely large antenna or aperture electronically and generates high-resolution remote sensing imagery. SAR is used to create images of an object, such as a landscape. These images can be 2D or 3D representations of the object. High-resolution SAR provides true, all-weather ground mapping and surveillance imaging, as well as Ground Moving Target Indication (GMTI).

Mapping out the landscape

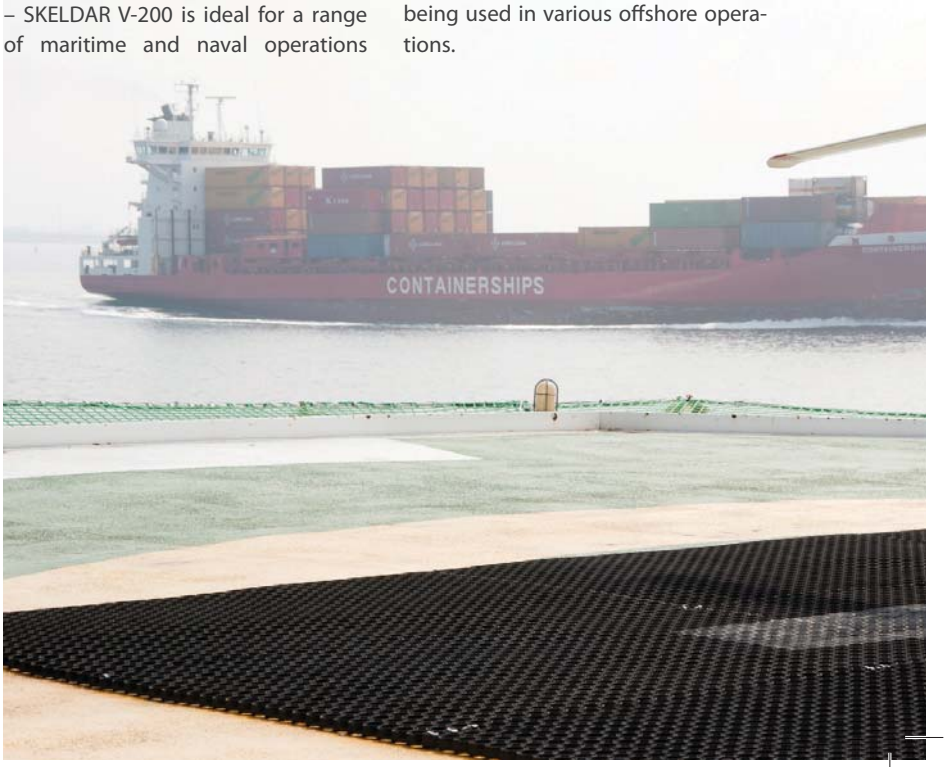
Laser Imaging Detection and Ranging (LIDAR) measures distance by illuminating a target with laser and analysing reflected light. LIDAR for 3D geographic survey systems provides geologists and mapping professionals with the ability to examine both natural and man-made environments with more accuracy, precision and flexibility, and to produce highly accurate maps and digital elevation models for use in geographic information systems.

Case Study

As a purpose built platform – originally designed for the maritime domain – SKELDAR V-200 is ideal for a range of maritime and naval operations from ISR and SAR roles to command and control and tactical roles for anti-piracy missions. Proven on anti-piracy missions worldwide, including the Indian Ocean/Horn of Africa through to South East Asia and elsewhere, UMS SKELDAR's UAVs provide long duration and in the air intel. It is in difficult and dangerous situations such as these where speed and covert operations can spell the difference between success and failure.

As an example, SKELDAR V-200 was deployed on naval assets during counter piracy patrols in the International Recommended Transit Corridor (IRTC) in the Gulf of Aden. Patrols help provide a safe and secure environment for merchant vessels. The UAS (Unmanned Aircraft System) was operated and maintained by UMS SKELDAR personnel, from a Maritime Patrol Ship. SKELDAR V-200 gathered intelligence and imagery, analysed by the Navy team.

The goal is to provide real-time intelligence gathering on the bases and camps of Somali pirates, as well as being used in various offshore operations.



The V-200 provided intel and endurance in high temperature, corrosive conditions of the Indian Ocean and coastal strip of the Horn of Africa. This mission exemplifies the versatility of the SKELDAR system, as a pivotal element of a seamless C4ISR solution.

Indonesia jumps in on Skeldar

Indonesia has become the first customer of UMS Skeldar to receive and complete acceptance tests. Indonesia's Ministry of Defence deployed Skeldar V-200 as part of performance and acceptance tests during Q4 2016, paving the way for procurement and pilot training. The move marked the beginning of a training programme contract with the Indonesian MoD. It is unclear, however, how many of the rotary-wing UAVs have been delivered to Indonesia.

"With the world's second-longest coastlines, the tests and patrol evaluations [in Indonesia] confirmed the multi-payload and low footprint of the Skeldar V-200 across land and navy applications," said UMS Skeldar.

One Chance to Get It Right

Coastal territories provide a range of challenging and often inaccessible environments. UAVs empower military and civilian agencies to deploy anti-terrorist and anti-smuggling operations through to protection of borders and vital infrastructure.

UMS SKELDAR's drones are proven on anti-piracy missions worldwide, where speed and covert operations demand reliability in difficult and dangerous situations.

From port security to anti-smuggling and drug enforcement operations, UMS SKELDAR's drones are an essential part of maritime police action. Applications range from container port goods management to surveillance of ship-to-shore transactions. Effective intelligence sharing and fast decision-making processes ensure fully optimised support and successful missions.

Pollution control and prevention are key strategies for the protection of humans and wildlife. UMS SKELDAR provides a range of command and control/surveillance options through its multi-role VTOL and Fixed Wing platforms to help prevent or mitigate natural or man-made disasters, including oil and chemical spillages.

UMS SKELDAR is headquartered near Basel in Switzerland, with twin manufacturing facilities in Switzerland (Möhlin) and Sweden (Linköping).

Alongside design and production, UMS SKELDAR develops its own associated systems which serve to fly various types of UAVs simultaneously on the same Ground Control Station (GCS). The company can provide customers with qualified ISR instructors for training of vehicles or to interpret sensor information alongside the RPAS capability requirement.

Reference Text/Photo:
www.saab.com
www.umsskeldar.aero